2099
7

THE GEOGRAPHICAL JOURNAL

PUBLISHED UNDER THE AUTHORITY OF THE COUNCIL.
EDITED BY THE SECRETARY.

VOL. XXXIX.—JANUARY TO JUNE, 1912.

110493

LONDON:
THE ROYAL GEOGRAPHICAL SOCIETY, 1, SAVILE ROW;
EDWARD STANFORD, 12, 13, AND 14, LONG ACRE, W.C.
1912.

PRINTED BY
WILLIAM CLOWES AND SONS, LIMITED
LONDON AND BECCLES.

X
910.6
R888 A

ROYAL GEOGRAPHICAL SOCIETY.

PATRON.

HIS MAJESTY THE KING.

VICE-PATRON.

HONORARY PRESIDENT.

Field Marshal H.R.H. the Duke of Connaught, K.G., G.C.M.G.

COUNCIL.

(ELECTED MAY 20, 1912.)

President—Rt. Hon. Earl Curzon of Kedleston, G.C.S.I., G.C.I.E., F.R.S., etc.

Vice-Presidents.

Admiral Sir Lewis Beaumont, G.C.B., K.C.M.G.
Major Leonard Darwin.
Douglas W. Freshfield.
Colonel Sir Thomas Hungerford Holdich, K.C.M.G., K.C.I.E., C.B., R.E.
The Lord Lamington, G.C.M.G., G.C.I.E.
H. Yates Thompson, J.P.

Treasurer—Edward L. Somers Cocks.

Trustees—Right Hon. Lord Avebury, D.C.L., LL.D., F.R.S.; Lord Belhaven and Stenton, D.L.

Honorary Secretaries—Colonel Sir D. A. Johnston, K.C.M.G., C.B., R.E.; Captain H. G. Lyons, D.Sc., F.R.S.

Foreign Secretary—Rt. Hon. Sir G. D. Taubman Goldie, K.C.M.G., F.R.S., D.C.L.

Members of Council.

Tempest Anderson, M.D., F.G.S.
Sir Hugh Barnes, K.C.S.I.
Admiral H.S.H. Prince Louis of Battenberg, G.C.B., G.C.V.O., etc.
Charles W. Campbell, C.M.G.
Douglas Carruthers.
Colonel Chas. F. Close, C.M.G., R.E.
Prof. Stanley Gardiner, F.R.S.
Albert Gray, K.C.
Colonel W. C. Hedley, R.E.
Colonel R. C. Hellard, C.B., R.E.
D. G. Hogarth.
Sir Everard F. im Thurn, K.C.M.G., C.B.
Sir Harry H. Johnston, G.C.M.G., K.C.B.
G. Wm. Lamplugh, F.R.S.
Dr. T. G. Longstaff.
Colonel F. R. Maunsell, C.M.G., R.A.
Prof. J. L. Myres.
Admiral H. E. Purey-Cust, C.B.
Sir Ernest Henry Shackleton, C.V.O.
Colonel Sir C. M. Watson, K.C.M.G., C.B.
Sir Frank E. Younghusband, K.C.I.E.

Secretary and Editor of Publications—J. Scott Keltie, LL.D.

Librarian—Edward Heawood, M.A.

Map Curator.
E. A. Reeves, F.R.A.S.

Chief Clerk.
S. J. Evis.

Bankers—Messrs. Cocks, Biddulph and Co., 43, Charing Cross.

110493

CONDITIONS OF FELLOWSHIP, &c.

Candidates for admission into the Society must be proposed and seconded by Fellows, and it is necessary that the description and residence of such Candidates should be clearly stated on their Certificates.

It is provided by Chapter V., § 1, of the Bye-Laws, that—

"Every Fellow shall, on election, be required to pay £5 as entrance fee, and "£3 as annual subscription for the current year, and thereafter a yearly sub- "scription of £3, due on the 1st January of each year; or he may compound either "at entrance by one payment of £45, or at any subsequent period on the following "scale, provided that there shall be at the time no arrears due by him to the "Society :—

Fellows of	10	years' standing	and under	15	...	£30
„	15	„	„	20	...	£24
„	20	„	„	and over	...	£18 15s.

"No Fellow shall be entitled to vote or to enjoy any privilege of the Society while "in arrear. Honorary and Honorary Corresponding Members and Fellows elected "under Chapter III., Paragraph 5, are not required to make any payments."

All Subscriptions are payable in advance, on the 1st of January in each year.

The privileges of a Fellow include admission (with one Friend) to all ordinary Meetings of the Society, and the use of the Library and Map-room. Each Fellow is also entitled to receive a copy of all the Society's periodical publications. The *Geographical Journal* is forwarded free of expense, to all Fellows whose addresses are known.

Copies of the Year Book, Regulations, and Candidates' Certificates may be had on application at the Society's House, 1, Savile Row, London, W.

CONTENTS.

Authors are alone responsible for their respective statements.

No. 1. *January.*

PAGE

The Geography and Economic Development of British Central Africa. By Sir Alfred Sharpe, K.C.M.G., C.B., LL.D. (with 3 Plates and Map) 1
Measurement in Economic Geography: its Principles and Practice. By B. C. Wallis 22
Dr. Nansen on North Polar Exploration. By Sir Clements R. Markham, K.C.B., F.R.S. 26
Miss Semple on the Influences of Geographical Environment. By Geo. G. Chisholm, M.A., B.SC., Lecturer on Geography, University of Edinburgh 31
Around the Dead Sea by Motor Boat. By Jacob E. Spafford (with 5 Plates) 37
Le Vaillant's Grotto at Heerenlogement. By Prof. H. H. W. Pearson (with Sketch-map and 3 Illustrations) 40
Base-measuring Apparatus—
I. By Sir David Gill, K.C.B., F.R.S. 47
II. Invar Tapes. By J. A. Agar Baugh 48
Major Gordon Laing, and the Circumstances attending his Death. From the Narrative of M. Bonnel de Mézières (with 1 Illustration) 54
Reviews:—
EUROPE—A Text-Book on Ireland. The Tree Lines in the Alps 58
ASIA—Asia Minor. Mesopotamia 61
AMERICA—North American Palæogeography 64
GENERAL—Economic Geography. Educational Books 66
The Monthly Record 69
Obituary—Colonel Edmund Smyth. Dr. R. D. Roberts 81
Correspondence—Geography in the 'Cambridge Mediæval History' 82
Meetings of the Royal Geographical Society, Session 1911-1912 84
Geographical Literature of the Month 85
New Maps 97

MAPS.

Sketch showing the position of Le Vaillant's Grotto 41
Sketch-map of South Georgia 78
Map of British Central Africa 104

No. 2. *February.*

North American Deserts. By Prof. D. T. MacDougal, M.A., PH.D., LL.D., Director, Department of Botanical Research, Carnegie Institution of Washington (with 8 Plates and Map) 105
Volcanic Craters and Explosions. By Tempest Anderson, D.SC. (with 8 Plates) 123
Travels in the Libyan Desert. By W. J. Harding King (with Map) 133

PAGE

Journeys in the Mo-Karanga (Southern Rhodesia). By R. N. Hall, author of 'Pre-Historic Rhodesia' (with 1 Plate and Map) 137
Determination of the Altitude of Mount Huascaran 139
Atlas of Terrestrial Relief 141
Reviews :—
EUROPE—Survey of the French Alps 143
ASIA—Bokhara. Armenia 144
AFRICA—The Baganda. The Tanganyika Plateau. The Racial Problem in South Africa 146
AMERICA 149
AUSTRALASIA AND PACIFIC ISLANDS 150
MATHEMATICAL AND PHYSICAL GEOGRAPHY—Climatic Control 150
GENERAL—Two Text-books of Commercial Geography. Wheat and its Cultivation 151
The Monthly Record 154
Obituary—Sir Joseph Dalton Hooker, O.M., G.C.S.I., F.R.S. George Murray, F.R.S. William Blakeney. Arthur de Claparède. Captain L. W. D. Everett. Henry Stone 165
Meetings of the Royal Geographical Society, Session 1911–1912 170
Geographical Literature of the Month 171
New Maps 187

MAPS.

Sketch-map of Ice Conditions in the Spitsbergen Seas, 1911 161
Sketch-map to illustrate a paper on North American Deserts 192
Part of the Libyan Desert 192
Sketch-map showing the Routes of Mr. R. N. Hall in the Mo-Karanga Country 192

No. 3. *March.*

Chinese Frontiers of India. By Archibald Rose, C.I.E., F.R.G.S., British Consul, Têng-yüeh, Yun-nan (with 4 Plates and Map) 193
Exploration in the Rocky Mountains north of the Yellowhead Pass. By J. Norman Collie, PH.D., LL.D., F.R.S., F.R.G.S., etc. (with 4 Plates and Map) 223
The Yale Peruvian Expedition: Preliminary Report. By Prof. Hiram Bingham, Director 235
Notes on the Ibo Country and the Ibo People, Southern Nigeria. By the Rev. George T. Basden, M.A. (with Map) 241
Experiments on the Settlement of Sand in Running Water. By Dr. John S. Owens (with 4 Figures) 247
Reviews :—
EUROPE 265
ASIA—Arabia. Travels through the Western Borderlands of China 267
AMERICA—Canada and Newfoundland. American Glaciology. Some little-known West Indian Islands 271
MATHEMATICAL AND PHYSICAL GEOGRAPHY — Hann's Climatology. Wheather Forecasting 274
POLITICAL AND COMMERCIAL GEOGRAPHY—The Supply of Iron Ores .. 275
GENERAL 276
The Monthly Record 277
Obituary—Lord Stanmore. By A. P. M. Admiral Sir J. C. Dalrymple-Hay 291
Correspondence—Unstead and Taylor's 'Commercial Geography.' By J. F. Unstead and E. G. R. Taylor. The Tsetse Fly and Big Game. By Captain W. Lloyd 293
Meetings of the Royal Geographical Society, Session 1911–1912 295
Geographical Literature of the Month 298
New Maps 305

Maps.

PAGE
Sketch-maps to illustrate the paper on Chinese Frontiers of India 312
Part of the Rocky Mountains north of the Yellowhead Pass 312
Sketch-map of part of Southern Nigeria 312

No. 4. *April.*

Exploration in Papua. By the Hon. Miles Staniforth Smith, Administrator of the Territory of Papua (with Map) 313
Journey through a portion of South-Eastern Tibet and the Mishmi Hills. By Captain F. M. Bailey (with Map) 334
The Climatic Limits of Wheat Cultivation, with Special Reference to North America. By J. F. Unstead (with 3 Diagrams and Map) 347
Note on Mean Sea-Level. By Colonel S. G. Burrard, R.E., F.R.S., Surveyor-General of India 366
Ten Years of Antarctic Exploration. By Hugh Robert Mill, D.Sc. (with Map) 369
Captain Roald Amundsen 375
Notes on Ngamiland. By A. G. Stigand (with Sketch-map) 376
Mrs. Schäffer's Discovery and Survey of Lake Maligne, Canadian Rockies (with Sketch-map and 2 Plates) 379
Gilchrist Studentship in Geography 381
Reviews :—
EUROPE 382
ASIA—Kashmir and its Mountains. Caucasia and Persia. Persian Travel 383
AFRICA—North-East Africa. African Climate 386
AMERICA—Labrador. The Canadian Rockies. Patagonia 389
The Monthly Record 392
Obituary—Lieut.-Col. Henry Strachey. By H. H. G.-A. Augustus Henry Keane, LL.D. By Prof. A. C. Haddon, F.R.S. Prof. George Davidson. Commander E. C. Dubois-Philips, R.N. 405
Correspondence—The Tsetse Fly and Big Game. By G. B. Beak, M.A. OXON., F.R.G.S., British Consulate-General, Genoa 407
Meetings of the Geographical Society, Session 1911–1912 408
Geographical Literature of the Month 409
New Maps 414

Maps.

Sketch-map of Ngamiland, South Africa 377
Sketch-map of Maligne Lake, Jasper Park, Alberta 380
Sketch-map of Portuguese Guinea 396
Sketch-map showing Explorations in Western Division of Papua 420
Sketch-map of the Route of Captain F. M. Bailey through South-Eastern Tibet and the Mishmi Hills 420
Map of Canada to illustrate the Paper on the Climatic Limits of Wheat Cultivation 420
Map of South Polar Regions 420

No. 5. *May.*

The Climatic Limits of Wheat Cultivation, with Special Reference to North America. By J. F. Unstead, D.Sc. 421
Observations on the Sir Sandford Glacier, 1911. By Howard Palmer (with Sketch-map and 4 Plates) 446
The Antarctic Expeditions of 1911–12. By Hugh Robert Mill, D.Sc. 453
Island-Names in Melanesia. By W. H. R. Rivers, M.A., M.D., F.R.S. (with Map) 458
The Projection for the International Map of the World 468
Reviews :—
EUROPE —A Study in Coast Geography. Wiltshire Maps 469

PAGE
Asia—Central Asia 472
Africa—The Central Sudan 474
America 476
Australasia and Pacific Islands 478
Polar Regions—Arctic Researches 479
Mathematical and Physical Geography—Seismology. Glaciers .. 480
General—Early Printed Books 481
The Australasian Antarctic Expedition 482
The Monthly Record 486
Obituary — Charles Beresford Fox. Dr. Richard Andree. Rear-Admiral Melville. Ralph Stockman Tarr. A. Lawrence Rotch 500
Correspondence—Mean Sea-level. By E. O. Henrici 503
Meetings of the Royal Geographical Society, Session 1911–1912 503
Geographical Literature of the Month 504
New Maps 514

Maps.

Sketch-map of Sir Sandford Glacier, British Columbia 450
Sketch-map of Kerguelen Island 495
Map of Melanesia 520

No. 6. *June.*

Exploration in North-West Mongolia and Dzungaria. By Douglas Carruthers (with Map and 4 Plates) 521
Morocco and its Future. By Alan G. Ogilvie (with Map) 554
Review of the Results of Twenty Years of Antarctic Work originated by the Royal Geographical Society. By Sir Clements R. Markham, K.C.B., F.R.S. (with Diagram) 575
The British Antarctic Expedition 580
Through the Lutzu Country to Menkong. By F. Kingdon Ward, F.R.G.S. (with Sketch-map and 2 Plates) 582
Bushman Paintings in the Ma-Dobo Range ("Matopos"), Southern Rhodesia. By R. N. Hall (with Diagram) 592
Environment in Turkey and Japan 596
Reviews :—
Europe 598
Asia—The Karakoram 598
Africa—The Kasai Basin 599
America—The American Fauna. Mexico. Tribes of Central Brazil .. 600
Mathematical and Physical Geography—Climatology. Weather .. 605
Anthropogeography and Historical Geography — The Erythræan Periplus 606
General—Early Travels 633
The Monthly Record 609
Obituary—George Borup 618
Correspondence—Climatic Limits of Wheat Cultivation. By Dr. J. D. Falconer 619
Meetings of the Royal Geographical Society, Session 1911–1912 619
Geographical Literature of the Month 620
New Maps 634

Maps.

Sketch-map showing F. Kingdon Ward's Route through the Lutzu Country to Menkong 585
Sketch-map to illustrate the paper on Exploration in Mongolia and Dzungaria 640
Maps to illustrate the paper on Morocco 640

2049
1

The

Geographical Journal.

No. 1. JANUARY, 1912. Vol. XXXIX.

THE GEOGRAPHY AND ECONOMIC DEVELOPMENT OF BRITISH CENTRAL AFRICA.*

By Sir ALFRED SHARPE, K.C.M.G., C.B., LL.D.

Attention was first drawn to "British Central Africa" by Dr. Livingstone in 1859. By the term "British Central Africa" I mean the present Protectorate of "Nyasaland," together with North-Eastern Rhodesia; that is, the British territory bordering on the Shire river, and on Lakes Nyasa, Tanganyika, Mweru, and Bangweulu.

The first attempt at any form of European settlement in this part of the continent was made by the "Universities Mission to Central Africa," who, on the strength of Livingstone's reports, sent an expedition to the Shire Highlands. This was withdrawn in 1862, but re-established on Lake Nyasa in 1881. In 1875 and 1876 the Free and Established Churches of Scotland both sent out mission parties to British Central Africa, the former settling on the western shores of Lake Nyasa, the latter at Blantyre in the Shire Highlands. And thus, as in some other of our colonies, the first steps for occupation, civilization, and development were taken by the Church.

In the earlier days the missions carried out a great Imperial work, more or less unconsciously. Quietly, unobtrusively, and by peaceful methods they reconciled many of the tribes who in former times had been at enmity, and did a great deal towards the restraint of raiding communities, such as the Angoni (Zulu), Awemba, and others. They initiated trading and planting industries, and became more or less the ruling power throughout a country of great extent. They paved the way for the British Government, which came in 1892 by the declaration of a protectorate over the Nyasaland regions. Before that date, however, our Foreign Office had more or less "bespoken" this part of Africa, first, by

* Royal Geographical Society, December 4, 1911. Map, p. 104.

placing a British official in the Shire Highlands, classed as a "Consul," next by the despatch to Nyasaland in 1889 of Sir Harry Johnston (then Mr. Johnston) with powers for the conclusion of treaties, and for dealing with the many problems awaiting settlement. It would be impossible to speak too highly of the work carried out by Sir H. H. Johnston. It was a case of the right man in the right place. A timid diplomatist might have hesitated to take important steps without definite authority, and might have altered the whole course of the future of British Central Africa—for the worse.

Cecil Rhodes was the immediate cause of the opening up of British Central Africa. It was largely due to his energy and liberality that the first steps were taken towards the establishment of British authority north of the Zambezi; and since the date when North-Eastern Rhodesia was handed over to the British South Africa Chartered Company, that territory, together with North-Western Rhodesia, has been administered by the company on the best lines with great success.

There is not time in this paper to give a history of British Central Africa. This can all be read elsewhere, but I cannot refrain from saying a word or two as to the "*ancient*" history of this part of the continent. Records show that the Portuguese had some knowledge of the Nyasa regions as far back as the seventeenth century, though they never established any stations there. They followed the line of "least resistance," the Zambezi river, which was navigable for small craft up to the Kebrabasa rapids. It may be taken as practically certain that at the very ancient period when at "Zimbawe" and elsewhere in Mashonaland there existed a flourishing gold-producing industry, the river Zambezi was known and navigated by the same ships which brought traders to the port of Sofala. No ancient rock-workings for gold have been found north of the Zambezi similar to those in Mashonaland, but it is not improbable that the traders of those days obtained copper from Katanga, and used the Zambezi as their most available transport route. With regard to the ruins in Mashonalands, no African race unaided ever erected these stone buildings, nor in my opinion, can they be dated back to anything but the most ancient times. The idea that Solomon got his gold there has sometimes been ridiculed; but why not? We know that in those times fleets were sent out from the Red sea periodically, which returned with gold, apes, ivory, and feathers—all products of Africa. These ships were probably identical with the Red sea dhows of to-day. Where would explorers with vessels of that type be likely to go first, on leaving the Red sea? Out into the Indian ocean? or down the African coast? They would of course follow down the land; and whether or not in King Solomon's days he got his gold from the East or the South, it may be taken as certain that the whole East African coast was then known and frequented by traders. It is interesting to note that the question as to who were the ancient people who worked the gold-mines of South-East Africa is no new

one. In that fascinating book, 'A History of Africa,' by John Ogilby, published in 1670, the matter is thoroughly discussed, and the arguments for and against King Solomon are fairly stated. Ogilby says, in speaking of the kingdom of Monomotapa: "In this country far to the inland on a plain stands a famous structure called Zimbawe, built square like a castle with hewn stones of a wonderful bigness. Above the gate appears an inscription which cannot be read or understood, nor could any that had seen it know what people used such letters. Near this place are more such buildings by the same name, signifying a court or palace. The inhabitants report it a work of the devil, themselves only building with wood." Also, as regards Sofala he says: "The inhabitants aver that this is the very true Ophir from whence King Solomon had his gold." Then follows a full statement of the arguments *pro* and *con*.

The geographical position of Nyasaland is a somewhat remarkable one. The Shire valley and Nyasa form the southern portion of one of the greatest "rifts" in the African continent. This depression, after a break north of the lake, is carried on for 400 miles by Lakes Rukwa and Tanganyika, and, with a few short breaks, runs on by Lakes Kivu, Albert Edward, and Albert, to the Nile valley. Following this route, a journey by boat could be made from the mouth of the Zambezi to the Mediterranean, a distance of over 4500 miles, covering 50 degrees of latitude, with a total distance of land portages of not more than 500 miles. A curious point about this great line of depression is that for a great part of its length it lies almost alongside the backbone of tropical Africa, the watershed in some parts approaching within a few miles of the lakes which lie along its course.

Most of British Central Africa has an average elevation of some 3000 to 4000 feet above sea-level. Here and there are higher plateau masses and peaks, which in some cases rise to close on 10,000. The most notable of these plateaux are "Nyika" in the North Nyasa district and "Mlanje" in the Shire Highlands. The former has an average altitude of 7000 to 8000 feet with an area of 2000 square miles, and a European climate; the Mlanje plateau lies at 6000 to 7000 feet, and has an area of some 250 square miles. Both are what Sir Harry Johnston used to call "Jack and the Beanstalk" countries, the plateau sides rising precipitously from the surrounding country, and being almost unclimbable. On Mlanje grows the *Widdringtonea Whytei* (Mlanje cypress), a large handsome conifer, a very valuable timber of excellent quality, durable and impervious to the attacks of white ants.

British Central Africa is drained (*a*) by the Nyasa-Shire-Zambezi outlet, (*b*) the Loangwa-Zambezi, (*c*) the Luapula-Congo. That portion of the Nyasa-Tanganyika plateau which borders on the route of the "Stevenson road" drains in five directions: (1) To Lake Tanganyika and the Congo, (2) to Nyasa, (3) to the Chozi and Luapula, (4) to Lake Rukwa, which has no outlet, (5) to the Loangwa and Zambezi.

But while the bulk of this portion of Africa lies at elevations over 3000 feet, the two main drains to the South, Nyasa-Shire and Loangwa-Zambezi, form deep depressions of considerable width, not attaining an altitude of anything over 1500 feet in their northernmost (highest) parts. One result of this is that British Central Africa has two climates, that of the low country, hot and somewhat unhealthy, and that of the uplands, pleasant and fairly healthy.

The seaport for the Protectorate is Chinde, which is situated in Portuguese territory, on one of the northernmost mouths of the Zambezi river. Navigation of the Zambezi was declared by the Anglo-Portuguese Convention, 1891, to be "free," and an arrangement was made between Portugal and England under which the latter received a concession of land at Chinde for the purpose of landing, storing, and transhipping goods passing between the coast and British territories inland, special customs facilities being given for carrying out these operations. Communication is carried on between the port of Chinde and Europe by several shipping companies, the most regular of which are at present the Union Castle Co. and the German East African line.

The Chinde bar is a bad one, and only allows the passage of vessels drawing 12 feet at half tide. Large mail steamers do not cross the bar, but discharge their cargo at Beira, whence it is carried round to Chinde in smaller vessels. Passengers cross the bar in specially built sea-going tugs. The point of land on which the town of Chinde is situated is being gradually washed away, and there seems little doubt that not many years will elapse before a new port for Nyasaland will require to be found.

There is regular communication between Chinde and the southern end of the Nyasaland Protectorate by river steamers, several companies being engaged in this traffic. The southernmost Protectorate settlement is "Port Herald," the present point of commencement of the "Shire Highlands Railway." This line runs up the western bank of the Shire for 30 miles, crosses the river at Chiromo, whence it follows the Ruo river for some distance, and eventually ascends 3000 feet to the Shire Highlands, and reaches its terminus at Blantyre, the chief business settlement in the Protectorate. On Lake Nyasa there are trading steamers and two Government steam-ships, the largest of which is 350 tons. The length of the lake is 360 miles, the average width about 30, and the voyage from south to north takes four or five days, the steamers calling at a number of ports on the way. From the north end of Lake Nyasa a road exists some 230 miles in length, connecting this lake with the south end of Tanganyika.

Recent rapid commercial development in Nyasaland has made it vitally important that the existing Shire Highlands railway should be continued south to the port of Beira on the East African coast in order to give through rail communication from the Protectorate to the sea, and that it should also be extended in a northerly direction to the south end of Nyasa in order to take advantage of the 360 miles of deep water

transport which that lake affords. When this is done there will be a line of cheap communication 800 miles in length from Beira to the Nyasa-Tanganyika plateau, which could again be extended for a further 600 miles by the construction of a 200-mile railway from Nyasa to Tanganyika. The districts which border on Lake Nyasa are waiting for through transport means to be provided to the sea-coast to enable them to export their products, which consist at present of rice and cotton, with a certain amount of rubber and oil seeds.

When I first knew Nyasaland, in 1887, there was an available line of water transport some 700 miles in length from the Zambezi mouth to the north end of Lake Nyasa, with one break only, the Murchison cataracts of the Shire river (which extend for some 40 miles). During recent times the course of the Shire has so rapidly and persistently silted up, both above and below the cataracts, that at the present day the upper portion is almost unnavigable at any season, and the lower river, instead of being available as a transport route all the year round from the sea to the foothills of the Shire Highlands, can only be used for a few months of the year as far as the junction with the Ruo river. The Shire gathers very little water on its course, and is the overflow pipe from the Nyasa tank. When that tank almost ceases to overflow, as is the case at present, the pipe *must* be more or less empty, and no human power can fill it.

This enforced abandonment to a great extent of the Shire as a transport route has been a terrible handicap on the growing planting industries of Nyasaland, which at this moment is unable to find a means of transporting to the sea-coast the cotton, tobacco, rice, maize, tea, rubber, and other marketable articles she is actually producing.

For the present fall in level of Lake Nyasa, the result of which is a far scantier and only intermittent overflow into the Shire river, it is difficult to assign any reasonable cause except a decreased rainfall in the basin; but such observations and records as have been kept at Lake stations during the last few years do not seem altogether to bear out this supposition. A theory which might to some extent account for definite cycles of rise and fall of the level of Nyasa (presumably due to lessening and increasing rainfall) has suggested itself to me, and I advance it for what it is worth. We are aware that Tanganyika has a natural outlet to the Congo. When Livingstone and Stanley were there this outlet was found (the Lukugu), but it was blocked up; it was clear from native evidence that the lake had been rising in level for a number of years. The prophecy was then made that sooner or later it would break out at its old outlet. This subsequently took place, and for years Tanganyika has sent its surplus waters to the Atlantic. I am not aware whether the Lukugu has yet closed again. A noticeable feature on Nyasa is an old beach-mark, 6 or 8 feet above the highest level to which the lake now rises. This mark is distinct and clear, especially on the rocks, and is carried round the lake both in the open and in the most secluded and

sheltered bays. It is abundantly evident that at some not very distant time the lake had this higher level, from which there must have been a *sudden* fall. Some few years ago during the dry season Nyasa ceased to overflow, and the bed of the Shire river at its exit began to silt up, reeds and other plants took root, and natives were able to walk across with only a few inches of water here and there. It would only have needed a few similar seasons for the outlet to have become entirely choked up, as was the case with the Lukugu. Is it not probable, therefore, that this has actually taken place at previous periods, and that the level of the lake subsequently rose till it overflowed the barrier and finally burst it? Is it not, moreover, probable that these cycles of fall, blocking up, rise and outburst have been going on for ages? A sort of recurring decimal.

The Nyasaland basin is very limited in extent. The bulk of the water which enters the lake comes in at its Northern end from high country lying beyond the Anglo-German boundary. Part of this country consists of a very interesting volcanic district in "Kondeland," which is dotted over with the craters of extinct volcanoes. On the east side of Nyasa the watershed between the lake and the Indian ocean lies within a few miles. No rivers of any size enter the lake from the east.

To refer to the climate of British Central Africa:—Throughout the higher levels from May to September inclusive, it would be hard to find a pleasanter climate. October and November are hot but dry, December to March constitutes the rainy season, April is cool and finer (the finishing of the rains). Malaria is of course the chief trouble. If this could be checked there is no reason why the elevated plateaux, not only of British Central Africa, but of many other parts of tropical Africa, should not be as healthy as Queensland. Knowledge which has been gained during the last ten years, largely through the exertions of the London and Liverpool Tropical Schools of Medicine, has enabled us not only to get a very much better insight into the causes of malarial fevers, but also to some extent to prevent their occurrence. Most tropical diseases are now known to be communicated by various biting insects, and if it were possible to protect ourselves against the attacks of these we should be able to prevent fevers. The difficulty, however, is to successfully carry this out. It is all very well to say that the only thing one has to do is to be sure that he lives under a mosquito net after sunset, and that if he does so he will never have fever; but in practice this is an impossibility. Moreover, there are many districts where mosquitoes bite during the daytime; and the various duties which Europeans have to carry out in the course of their employment, whatever it may be, often render protection impossible. Serious attacks of malarial fever are not nearly so common in Nyasaland, however, as they were 10 or 20 years ago, and this is largely due to the fact that Europeans live in far greater comfort than formerly.

A few years ago the first cases of sleeping sickness were discovered in British Central Africa. The disease reached this part of the continent

SHIRE HIGHLANDS.

ZOMBA PLATEAU.

TYPICAL ROAD IN NYASALAND.

MONKEY BAY, LAKE NYASA.

from the Congo State, having no doubt been carried to the shores of Tanganyika and Mweru and to the Luapula valley by the numerous expeditions from the Congo to the eastern boundaries of the Free State. It quickly established itself on Tanganyika and Mweru and in the Luapula valley, also along the banks of several of the larger rivers running into Mweru and Tanganyika. Quite recently cases have appeared in the valley of the Luangwa, and also in the country bordering on the south-western shores of Lake Nyasa, and it is evident that there is in this part of Africa some hitherto unknown agent which carries the germ of sleeping sickness, as the tsetse fly known as *Glossina palpalis* does not exist in the Protectorate of Nyasaland (although it is found on Lakes Tanganyika and Mweru). More than one expedition is now at work investigating these interesting questions, and especially as regards the connection between tsetse fly and big game. Whatever the results obtained by these expeditions may be, however, it is I think already evident that sleeping sickness will not prove to be such a scourge in these parts as it has been in Uganda.

It has been believed by many that the presence of game, and especially buffalo, is responsible for the existence of tsetse fly. After many years spent in travelling over every part of Nyasaland and much of Northern Rhodesia, Portuguese, and German East Africa, and the upper Congo, I arrived at the conclusion that the weight of evidence is against this theory, so far as tropical Africa is concerned; and in this belief—namely, that *tsetse in these regions does not depend on big game for its existence*, I think that all who are entitled to speak with authority—including Mr. Selous—are now agreed.

The question as to whether British Central Africa can be really considered to be "colonizable" in the generally accepted sense of the word, is still a matter of some doubt; that is to say, whether Europeans can settle in the country, marry, and bring up healthy families without the necessity for periodical visits to more temperate climates.

Colonization by British in the tropics has been carried out on different lines to colonization by the Latin races. With us, we have never mixed and interbred with native races in any of our possessions. I say this in a general sense: there has, of course, been a certain amount of interbreeding everywhere, but with us it has been so small as to be practically not worth consideration. The result of this keeping apart of the races, the native and the white, has generally been considered by us as an advantage. It results, however—of necessity—in there being always superior and inferior races in the one country, the governing and the governed, and to a great extent the pushing and capable as distinct from the slack and unenergetic, the man with means and the labourer. A further result is, moreover, that in our really tropical colonies the white is not a genuine "colonist." He is there for a time only, the length of his residence being as a rule the period required for the acquisition of sufficient wealth to enable him to return to his own land. In some of our tropical possessions if, owing to

any means, all the whites were suddenly withdrawn, within a generation it would be impossible to see any trace of superior civilization having ever existed. This would be the case in the African Protectorates.

The Latin races, on the other hand, have in many of their colonies freely interbred with coloured populations, and this interbreeding has resulted in mixed races, such as the Brazilians, Peruvians, Venezuelans, Goanese, and so forth. In these cases when eventually the connection with the mother country has been severed or modified there has been a race certainly greatly superior in intelligence and energy to the original coloured population, capable of self-government and of advance in civilization. It is after all, therefore, a question, as to which method results in the end in the greatest actual good to the country itself.

One thing, however, is certain: We, the British, whose own country is full to overflowing with people for whom we can find no room, must in the interests of posterity hold on to any possessions we have, in no matter what part of the world, which are capable of even a modified form of white colonization. What is inaccessible to-day may be easily accessible in a few years' time. What is unhealthy to-day may be found healthy by-and-by. The time will eventually come (though not in our lives) when Australasia and America will be more or less filled up, and when emigrants will have to look elsewhere for new lands.

To turn to the development of British Central Africa which has been taking place during the last twenty years or more. The white population numbers between 600 and 700—planters, traders, missionaries, Government officials, and so forth. Up to the present all development has been agricultural. The first crop planted for export was coffee, and, indeed, for some years this constituted almost the sole export (with the exception of ivory). Owing to one cause or another, however, lowering of market prices and some uncertainty in the crops obtained, coffee has gradually given way to tobacco and cotton as leading exports.

Cotton produced in the Highlands is now specifically classed in the market as "Nyasaland," and fetches about 2*d*. a lb. more than "Middling American." It has an exceptionally long staple, strong fibre and good lustre; it has occasionally been (wrongly) classed as "Egyptian." Eight hundred tons were exported last year. The Nyasaland variety has been arrived at by a long process of seed selection, and there could be no better example of the necessity for most careful selection of seed in the growth of any crop in the tropics.

In the low country, that is to say, on the banks of the Shire river and Lake Nyasa, Egyptian varieties can be grown, and much experience has been gathered during the last four or five years. The seasons are different at the lower elevations. American cotton in the highlands requires to be planted with the first rains in November, whilst Egyptian in the lowlands is not put in the ground until January or even February. Government encourages the native cotton-planting industry in every possible

way, especially by the free distribution of seed, and by the remission of half the hut tax to all natives who pay their tax in cotton.

One of the most interesting recent developments has been this taking up to some extent of cotton-planting by natives. It gives larger possibilities in the way of big exports than cultivation by Europeans, as, if every native who lived in country suitable for cotton growing were to put in a small patch of say an acre round his hut, there would at once develop a very large output. Native-grown cotton is at present bought by European planters and traders at a penny a pound for the cotton in seed, which is equivalent to about 3¼*d.* a pound for the lint. This lint, during the past year, fetched in the English market an average of 10*d.* a pound.

With regard to tobacco, 850 tons were sent away last year, and fresh ground is being put under this crop. An incentive to planters to grow tobacco has been the establishment in the country of a curing factory by the Imperial Tobacco Syndicate. I am informed that this firm is quite satisfied with their experience so far, and that all they desire is to be able to purchase more leaf. They buy from planters, cure the tobacco scientifically, pack it in hogsheads and ship it to England. The tobacco is grown from Virginia seed, and requires a light sandy soil.

Both the coffee, cotton, and tobacco industries are now well established, and local experience has been gained (often painfully) which enables planters to know exactly how to go about their work. In all new planting industries, although much can be learnt from experience in other colonies, there are always special local conditions which are bound to upset calculations more or less, and nothing but experience, often very costly, gathered in the country itself, can give a proper knowledge as to what local conditions really are.

During the past three years, there has been a small export of tea. The greater part of the Protectorate is not suitable for its cultivation, as the dry season is too long, but in the Mlanje district there are some 20,000 acres where the rainfall mostly exceeds 100 inches, and is distributed well throughout the year. The original seed was imported from India. A variety of fibres are produced, and as this is a crop which takes but little attention, and can be placed on poor soil, there appears to be the probability of a considerable export before long. Ground nuts are mostly grown by natives, but it does not pay to export them from the central or northern parts of Nyasaland, as the cost of transport is too high. In the extreme south, natives plant them largely and sell to traders for shipment to Hamburg and Marseilles. The description of rubber formerly exported was that obtained from the "Landolphia" vine. This creeper, however, was so ruthlessly cut down in the early days of the Protectorate, that at present little is collected. The vines, being now protected, will in course of time recover, and the export of Landolphia rubber will no doubt increase. In the mean time, planters have gone in extensively for planting various descriptions of rubber trees, chiefly "Ceara." In most parts of

Eastern Africa the climate is too dry for "Para," but there are districts near the west coast of Lake Nyasa where this rubber tree is doing well.

Most of those who have started planting operations in Nyasaland have had very little money, and the question of whether a man stood or fell has often depended upon whether his first season happened to be a good or a bad one. Planters have done well on very small capital, many of them having started on two or three hundred pounds. What is now required, however, is the man with say £1000 to £2000 at his disposal; he will undoubtedly do well.

Land can be obtained on easy terms. At the date of the declaration of the Protectorate, considerable areas, particularly in the Shire Highlands, had already passed into the hands of Europeans by purchase from native chiefs and their people. These land claims were examined; such as were considered good were allowed, others disallowed, and again others cut down in extent. The remainder of the land in the Protectorate is considered as belonging to the Crown under various treaties and agreements made with the chiefs and people before and since 1891. The policy followed has been for Government not to make free grants of land nor to sell large blocks, but to endeavour to keep the bulk of available land for sale in comparatively small plots to intending settlers, planters, and farmers at low prices and on special conditions. A planter can obtain land from Government on the following terms: He can lease at a rent calculated at 5 per cent. on the capital value of the land at the date of his lease. If at any time he wishes to obtain the freehold, he can do so, and the rent which he has paid will be taken as part payment up to 50 per cent. of the total value. The capital value depends largely, of course, on the situation, whether near to the railway or to a good high-road, but in the Shire Highlands at the present date it may perhaps be said that good cotton, coffee, or tobacco land is worth ten to fifteen shillings an acre, or more in specially favoured localities.

A planter's life in Nyasaland is not by any means a disagreeable one. For a considerable portion of the year the climate is pleasant, and a constitutionally sound man should have good health. His occupation will give him ample interest. He can, at very little expense, provide himself with a comfortable brick house. Food and provisions grown in the country are cheap, and by way of relaxation if he is living in the Shire Highlands he can find amusements such as golf, tennis, cricket, hockey, etc., and big-game shooting in most parts.

A product of which there will be before long a large export is maize; and again in this case it would not pay to grow and export from the more distant parts of the Protectorate, but with some slight decrease in the present cost of transport, the southernmost districts could put this article on the European markets at a profit.

There has been as yet little development of minerals, although a great variety have been discovered, but hitherto in barely payable quantities:

the following, *inter alia*, gold, silver, lead, iron, coal, plumbago, and mica. In the way of gold, nothing better than three to four pennyweights to the ton has been found. Galena lodes have been discovered yielding from twenty-five to thirty ounces of silver to the ton of ore. There is, I think, little doubt that with practical prospecting payable minerals will be found.

One of the country's best assets is its cheap labour supply. The *working* native population may be put at about 100,000 men every year. Of these, present local industries consume possibly 10,000 to 15,000. Many have hitherto found their way in search of employment to different states of Southern Africa, mostly Rhodesia, but in some cases as far as the Transvaal and Kimberley. The conditions as regards local employment are as follows: for eight months in the year, that is, during the dry season, which lasts from the end of March to the middle of November, labour can be obtained in almost any quantity. During the wet months, from the end of November to the end of March, very few natives are anxious to work on plantations, except such as have already been engaged during the dry season for periods reaching over the rains. With regard to the engagement of Nyasaland native labourers for work in territories south of the Zambezi, employers in the Protectorate are naturally jealous of any encouragement of this exodus, as they fear that men who have worked in the south and earned wages of £2, £3, or even up to £5 a month would be unlikely to return to work on plantations within the Protectorate, where the average wage given is 3*s*. to 4*s*. per month. The evils, however, of an unregulated system of emigration become more and more evident during the last few years. Natives were in the habit of finding their own way south. They suffered great hardships on their journeys there and back, and were frequently robbed of their earnings on the return journey. No definite agreements could be entered into in advance as to the term of their service, the rate of wages, or the reservation of some portion of their pay to be given them on their return; and generally the condition of affairs was unsatisfactory. Some years ago the Protectorate Government took the matter in hand and endeavoured to arrange a system under which all natives who insisted on going abroad to work should do so under Government control, the Governments of the southern states making themselves responsible for the carrying out of certain reasonable conditions regarding the comfort of men on the journeys to and fro, the payment of definite wages, the reservation of a portion of the wage till the return to their own country, and regarding their general treatment during the term of service. There are only two courses open with regard to this exodus of labourers, the one is to ignore it, the other to control it. If the former course were taken, it would not be long before the whole working population of Nyasaland would be drawn to the south. By the adoption of a sensible system of control the number emigrating can be kept within reasonable limits, and some benefit secured to the Protectorate itself.

The Revenue of Nyasaland has steadily increased from nil in 1891 to

£95,000 last year (of which the native hut tax is accountable for nearly half). The expenditure for that year was £112,000, of which, however, a considerable sum is due to military expenses in connection with native troops raised in, and paid by Nyasaland, but used in other parts of Africa. The country has arrived at a period when it may be looked on as practically self-supporting.

During the year 1910–11 the general external trade (import and export), not including goods in transit, amounted in value to £368,621, as against £223,495 in the year 1909–10, showing an increase of £145,126, equal to 64 per cent. The value of imports increased from £112,000 to £200,000, or 77 per cent. Exports, from £111,000 to £169,000 (*i.e.* over 50 per cent.).

The following extract from the official report for the past year evidences the steady advance made by this small slice of British Tropical Africa, and shows what is possible where some small measure even of available transport to the coast exists. It is no exaggeration to say that the whole of the present development is due to the fact that the Protectorate had in the beginning the very indifferent line of water communication by the Shire and Zambezi rivers.

"The year was the best cotton season which the Protectorate has experienced, cotton ripening late into the season, and on many estates producing the heaviest crop that has been reaped since its introduction as a European cultivation. The European acreage increased from 8975 in the previous year to 12,752 for the year under review, whilst the crop at present being harvested covers over 23,000 acres. The exported crop, in bales of 400 lbs., for 1909–10 amounted to 2147 (ginned cotton), and for the year under review to 4342 (ginned cotton), showing an increase of over 100 per cent. in a single season. A gratifying feature is the increased interest which planters are now taking in seed selection. The results of the experiments carried out on the Government agricultural stations show the great advantage and profit of such work as is being undertaken there.

"The quality of the staple has been maintained, and the first-class cotton of the Protectorate shows such improvement that its valuation fluctuates more with the Egyptian crop than with the American crop as in the past. The large Egyptian crop last season made prices a little lower than in the previous season, but the top price of the season, viz. 1*s.* per lb., shows that Nyasaland upland still maintains its position as the highest priced upland cotton in the world. This excellent variety is becoming thoroughly acclimatized, and its success in West Africa and Rhodesia indicates that it will become in time the most extensively grown variety in the new cotton-fields of Africa. Its special quality is its wonderful adaptability to elevations of from 1000 to 3000 feet, its high degree of immunity from bacterial blight, and its hardiness.

"The Egyptian crop on the lower river was more successful than in the previous year, as planters now understand that it is useless to attempt

to grow Egyptian cotton except on the best drained parts of plantations at elevations under 1000 feet.

"The native cotton crop has risen from 220 tons to 692 tons (in the seed). In several districts this industry has now become so thoroughly established as to admit of the withdrawal of the hut tax rebate which was allowed as an incentive to native cultivators when the enterprise was first introduced. The experiment of encouraging natives to apply themselves to this cultivation has proved a remarkable success in every way. It is worthy of note that some of the native cotton from Mlanje District has sold for as much as 1*s.* per lb.

"A large increase in the acreage of tea plantations has to be recorded, viz. from 518 to 1037 acres. The export of tea was 42,042 lbs. as against 34,601 lbs. The area of tea actually in bearing, however, is still relatively small, the crop being one which requires several years to arrive at the productive stage. The success of this industry has attracted much attention and interest, with the result that improved machinery for the treatment of the crop has been imported, and considerable competition has arisen for land in the tea-growing portions of Mlanje district.

"The tobacco season has been satisfactory, although not quite so good as last year. The acreage under this crop is 3274, while the export of tobacco for the year under review amounts to 1,704,637 lbs., as compared with 1,084,757 in the previous year.

"The acreage under rubber is still increasing, and although no estates are in full bearing, rubber promises well in Mlanje, West Shire, and parts of the Shire Highlands. It is now proved, however, that rubber cannot be profitably cultivated in all parts of the Protectorate.

"Para rubber in the West Nyasa district still continues to show much promise, and the acreage under this crop has been increased to 726½ acres in the past year.

"The exploitation of *Landolphia parvifolia* has been carefully conducted by the African Lakes Corporation, Limited. The value of this product is satisfactory, viz. 3*s.* 9*d.* to 4*s.* 4*d.*, with fine white Para quoted at 5*s.* 2½*d.* Good prices have led to a large increase in the export of rubber, extracted principally from wild vines. The total quantity exported during the year under review amounts to 59,471 lbs.

"Exports of maize for the year under review amounted to 39,984 cwts., valued locally at £6002, showing an increase in local value of £1990. This, however, is not a tithe of what could be exported if transport facilities were improved. The local purchase price of maize from natives at harvest time is £1 to £1 5*s.* per ton.

"The export of chillies during the past year amounted to 142,176 lbs. as against 119,126 lbs. in the previous year, showing a considerable increase. There was a good demand for the crop."

The native population of the Nyasaland Protectorate is a little over one million—it is the most densely populated section of South Central

Africa. The people belong to a variety of tribes. They are an excellent lot, tractable, cheerful, not disinclined for work, and anxious to do so far as lies in their power all that Government can reasonably ask of them. Two or three of the tribes make excellent soldiers, and have for many years past supplied the ranks of the first and second battalions of the regiment known as "The King's African Rifles." These have seen active service in British Central Africa, British East Africa, Somaliland, Ashanti, and Gambia. They have also been employed for garrison work in Mauritius.

In some parts Mohammedanism has spread rapidly within the last few years, and in most Yao villages (the tribe amongst whom it has the greatest hold) will be found a hut used as a mosque. The native as a rule has a somewhat cloudy idea of the religion he attempts to follow, but there is little doubt that Mohammedanism has found a permanent home in British Central Africa. At present, at any rate, it has nothing in the shape of fanaticism, and natives are fully aware that they are free to follow their own convictions.

The relations existing between natives and Government officials are of the best. All the higher chiefs once or twice a year of their own accord journey to Zomba (the Government headquarters), and should they have any matters concerning their districts and people they desire to bring directly forward they know they are at liberty to do so without fear. The native has realized that education has its value, and that comparatively well-paid positions of trust can only be obtained by this means. He is eager to learn, and the demand for schooling is so great that there are few villages, however small, which cannot produce at least two or three "boys" able to read and write. Young educated natives are in request, and they are found (after a year or two's training) to be as competent as the India "babu," and much cheaper.

The slave trade which was rampant in Nyasaland twenty years ago has for a long time been entirely abolished. No form of slavery is recognized, and every native is, and knows that he is, a free man. There has been material advance on the part of the natives due partly to the general increase of civilizing influences, and largely to the work carried on by various missionary societies. Many of the better educated have bought blocks of freehold land from 10 to 200 acres, on which they plant cotton, coffee, or tobacco, in addition to grain crops. This class of native often live in good brick-built houses in a semi-European style. Others are skilled cabinet-makers, joiners, bricklayers, brickmakers, masons, and so forth. A few again (mostly Atonga) have set up small retail stores. The Protectorate is free from any native liquor question, as it is contrary to law to supply alcohol to natives. With few exceptions they have acquired no taste for European spirits.

With regard to sport, excellent shooting can be had, the best districts being those bordering on Lake Nyasa, and in the high country west of the

TYPICAL GRANITE PEAKS IN ANGONILAND.

MARCHING THROUGH ANGONILAND.

lake. In the Shire Highlands, owing to increasing settlement by planters and farmers, game is becoming somewhat scarce within reasonable reach of settlements. The regulations with regard to game are not difficult to comply with, the highest licence obtainable costing £25, and allowing the holder to shoot two elephants as well as other game, of which a reasonable number of each specie is allowed.

For a shooting trip the best season to reach Chinde is about the end of June. The fires do not commence to clear the country of grass until July. The best shooting months are August and September, although for any one who does not mind the high temperatures of October and the commencement of the rains in November, those two months are, in some respects, better than any, as the country is then absolutely clear of all high grass. During the months of July, August, and September there is no rain, and a camping and shooting journey can be carried out with little trouble, and practically no discomfort. Good gun boys and trackers can be obtained, and there are now quite a number of natives in the country who are used to skinning and preserving trophies.

In the country are found elephant (in certain districts), rhinoceros, hippopotamus, buffalo, eland, kudu, waterbuck, reedbuck, bushbuck, impala, sable antelope, roan antelope, inyala (in one district only), duiker, oribi, gnu, warthog, bush pig, zebra, hartebeest, and a few other varieties; also lions, leopards, and other smaller beasts of prey. In some of the marshes, such as those bordering on Lake Shirwa, there is excellent wildfowl shooting.

Trout—both rainbow and brown—have been successfully acclimatized in the Protectorate, and the Mlungusi stream on Zomba mountain is now full of fish. But no angling is allowed at present, as it is intended to keep this stream as a natural hatchery, from which fish can be supplied to other rivers in the country.

Throughout Nyasaland, roads of one kind or another run in almost every direction, the total mileage of these reaching into thousands; not all of them, however, are passable for wheeled vehicles. The main road throughout the country starting on the Shire river, a little south of Blantyre, runs through the Shire highlands and more or less in a northerly direction to the north extremity of Lake Nyasa. This road can be traversed by wheeled vehicles for a distance of some 400 miles. A portion which lies between Zomba and Blantyre (a distance of a little over 40 miles) is metalled, and is probably the best road between the Cape and Cairo. There are two or three motor-cars in the Protectorate, which have many difficulties to contend with, except on the Zomba-Blantyre road. Motor-bicycles are useful and are able to run on most of the roads. There are some forty in use, and on them journeys of up to 120 miles in a day may be made.

When travelling on a motor-bicycle in Africa, one not infrequently sees game. I have often passed close to various kinds of antelope,

waterbuck, sable, kudu, and others. The noise of the engine startles them, but one is so quickly upon them, when close to the road, that they do not realize what the approaching beast is like until it is within a short distance. A missionary who was once going by night on a motor-bicycle from Zomba to Fort Johnston, a station at the south end of Lake Nyasa, a distance of about 80 miles, and who had a powerful acetylene headlight on his machine, was suddenly startled by seeing some brownish thing in the middle of the road. As he approached, he found it was a lion staring at the brilliant light. He jumped off, and, keeping the lamp straight at the lion, waited. It could not see him, of course, as it was dazzled by the light. Presently it bounded off into the high grass. He quickly mounted his machine and went full speed past. Any one who desired to make a motor-cycle tour in an out-of-the-way part of the world might do worse than tour through Nyasaland from north to south. He would have a fairly good road for a distance of some 500 miles. His journey would take him through a great variety of interesting country, both high and low, and he would have many opportunities of big-game shooting, including elephants.

The Government head-quarters of the Protectorate are at Zomba, in the Shire highlands. This settlement lies at an elevation of some 3000 feet above sea-level, amidst beautiful scenery, on the slopes of the Zomba mountain, one of the steep plateau-topped granite masses of Nyasaland. The mountain rises almost precipitously 3000 feet above the settlement. On the high plateau numbers of small substantial houses have been built by Government and private owners, and in the hot season the population of Zomba spend much of their time on the plateau. A well-graded road has been made, connecting it with the settlement, passable for motor-cars, bicycles, rickshaws, and other wheeled vehicles. From the plateau a stream of some size falls over the cliffs, and gives the settlement a very pure water supply. The fall is used for obtaining power, which drives machinery in the workshops and the dynamos which supply the settlement with electric light. Native skilled labour being inexpensive, the cost of electric light in this part of Africa is cheaper probably then in any European city.

Although called a " Protectorate " the form of Government is precisely that of a Crown Colony, with a " Governor," assisted by Executive and Legislative Councils, the latter having several unofficial members. There is a small measure of self-government in the shape of Town Councils and Road Boards.

In these days when a European power occupies and proceeds to administer a country inhabited only by natives low in the scale of what we consider as civilization, after a while we ask ourselves, " How has that occupation been justified ? Have we dealt with British Central Africa in such a manner that our rule has been firstly an advantage to the native races, secondly, of benefit to our own nation ? " We cannot afford to be

purely philanthropic in these matters—we do not enter upon such enterprises with the sole view of benefiting the African: we have our own purposes to serve, but they must be served in such a way as to operate to the advantage of all. I have little hesitation in replying that our occupation has had the best results, and from all points of view. So far as our own interests are concerned we have opened up a promising part of Tropical Africa. Where nothing of commercial value or use existed, we find to-day flourishing plantations of cotton, tobacco, and other products, comfortable homesteads, and thriving European settlers, many of them with wives and families. A new country is being developed as a field for British enterprise. From the African's point of view, instead of raids, slavery, oppression, and the entire absence of security for property or person, we find peace, freedom, and a contented and thoroughly satisfied native population. In place of the old disinclination to own or to acquire anything of value lest it should prove to be the cause of strife, robbery, and bloodshed, we now have many natives who have taken to the rearing of live-stock, and to the planting of cotton and other marketable crops. I venture to say that there is not a native in British Central Africa, who, if asked, would not tell you how much better off he is and how much he prefers the life of to-day to that of the old times.

As to the future, it is one of much promise. Given a country with a very fair climate, rich soil, and an abundant supply of cheap labour, all that the steadily increasing number of European settlers ask is for better facilities for transport—railways and roads. There can be no better investment in the interest of British commerce than the provision of railways for such of our Colonial possessions as have products to export. Even the short existing line in its first working year paid expenses and had a surplus of profit.

In African Colonies the largest question of all is the "Native question." In British Central Africa at present all is well in regard to this. The native population is satisfied with things as they are. But as the Europeans increase in number—and from one cause or another, agricultural and mineral development, their number may very rapidly increase—the needs and requirements of the native must never be overlooked, nor subordinated to those of the Europeans. These are not only questions of what is right and what is wrong. There is the still greater question of what is expedient. So long as we treat our native populations in Africa justly and fairly, and deal with them frankly, openly, and sympathetically, we have little to fear.

Sir Lewis Beaumont, Vice-President (before the paper): Owing to the unavoidable absence of Lord Curzon, I have very unexpectedly been asked to take the chair. I have to introduce to you the lecturer, Sir Alfred Sharpe, who must be well known to a great many here present. Sir Alfred may be said to have begun his official career in the Fiji islands many years ago. Then from Fiji he went to Central Africa, mainly in pursuit of big game. Sir Harry

Johnston, who was the British representative at that time, soon recognized his value, and invited him to join the administration in Central Africa, and Sir Alfred's work was so very important that in the end he became the Governor, retiring only this year. I am sure all that he has to tell us will be most interesting.

Sir HARRY JOHNSTON: I really only came here to-night to renew my acquaintance with a region in which I was once interested, and also to mark my remembrance of seven years' comradeship with the lecturer in laying the foundation of this Protectorate. I have not anything novel to say about the geography of this region, except, perhaps, to insist on the fact that when we have even succeeded in mapping any one region of Africa, or the rest of the world, we are not to suppose that its geographical research is at an end. On the contrary, in Nyasaland especially, we are only just beginning our real researches. I only say this in case there are young men present who are going out to take up such work as Sir Alfred Sharpe and I have done in the past; that they should not think there is nothing left for them to discover and lay bare, because I believe we are on the threshold there of very important discoveries. I would strongly impress upon them, above all, the importance of geological investigations, even those which perhaps are not immediately profitable, but which would reveal much of the past history of Africa, its fauna and flora. In the north part of Nyasaland especially, it is believed, from what indications we have, that very remarkable revelations could be made as to the fauna and flora of South Central Africa in Mesozoic times.

But the few words I should like to add to this evening's discussion would be rather about the lecturer than the lecture. I feel that Sir Alfred Sharpe has not perhaps done himself justice in his lecture. Through his characteristic modesty, he has perhaps wished to give you something as purely geographical as possible, and very properly has avoided matters which would be treated more appropriately at the Royal Colonial Institute; but I wish he could have let himself go and have told you a few of his extraordinary adventures in Central Africa. I think few people, from my knowledge of him, have gone through more remarkable scenes and have hazarded greater dangers and staked their lives more frequently than Alfred Sharpe, and invariably he has done so through disinterested motives. He came as a shooter of big game; he wished to see something of the north end of Lake Nyasa, and hearing that the African Lakes Company was involved in a war with the Arab slave-traders—a war in which Sir Frederick Lugard played a very notable part—Sharpe went as a volunteer and was wounded. He came back when his wound was healed, and more by accident than design we met, at a time when I was very hard up for an assistant. I had cherished great schemes, great enough to justify my ambitious title of "British Central Africa," applied to what has now shrunk to Nyasaland; and one of the men to whom I looked to assist me broke down in health and had to go away; the other, Mr. John Nicoll, had to accompany me to the seat of the Arab war. But I wanted somebody perhaps more adventurous, more daring, more able to make bricks without straw; I wanted almost an impossibility, a phœnix, and that presented itself quite suddenly in the person of Sir Alfred Sharpe. I landed on the shores of the Elephant marsh to try and shoot some big game as food for my boatmen, managed to bring down a waterbuck, and had straightaway got out my sketch-book to sketch it, when some one leaned over my shoulder and said, "Very good sketch that." I looked up, and I guessed it must be Sharpe. There were very few Europeans about in those days, and I think in an hour's time we

made our plans, and he agreed to start for the heart of Africa, if need be. I could give him little money and practically no advice, and no men of any practical value. He got fifteen porters, and with these and a small quantity of trade goods he made one of the most remarkable marches in the history of the development of Africa. He walked all the way from the Shire Highlands to the southern part of Congoland, calling on the way at the upper Zambezi to secure that before the Portuguese could get there. He hoisted the British flag near Zumbo, and secured to us a free way up from the south to the north. Then he continued this wonderful march until he reached Lake Bangweulu and Lake Mweru and the Mweru swamp, and so he went into Katanga—the scarcely known country in those days of Katanga, ruled by an adventurer named Msiri. He would have secured, so far as these treaties went, Katanga for the British flag but for various political considerations; so the British Central Africa which had been further extended northwards by Mr. Swann's and my own treaties was truncated, and finally became the Northern Rhodesia and Nyasaland as you see them to-day.

I would close my remarks by hoping that Sir Alfred Sharpe may set to work now and write down a record of the very remarkable years which he has spent working for the British Empire in Central Africa between 1887 and 1911.

Mr. WILSON FOX: I feel sure you will forgive my temerity in following, in questions relating to British Central Africa, such giants in the work of exploration and administration as Sir Alfred Sharpe and Sir Harry Johnston, and it would be impertinent upon my part to do more than thank them for the extremely interesting narrations they have given us. But I should like to make some further reference to one who I think should always be mentioned in connection with the development of those regions—I refer to the name of Cecil Rhodes. I have the less hesitation in making these remarks because no two men have done more to forward the great work of Cecil Rhodes than Sir Harry Johnston and Sir Alfred Sharpe. In the early days of British Central Africa a contribution paid by the British South Africa Company largely enabled that work of expanding British rule to be carried on. If you consult the maps in your hand you will see that, while the greater portion of the territory to which Sir Alfred Sharpe has directed your attention this evening lies in Northern Rhodesia, his address really has been devoted to Nyasaland only. Now, I should not like you to go away this evening feeling that the only work that has been done has been carried out by the British Government in Nyasaland, and I feel sure that Sir Alfred Sharpe will endorse the statement that a very great work has been and is still being carried on in those regions by the British South Africa Company. I may remind you that the only telegraph line in Nyasaland was entirely constructed by the British South Africa Company, and that until comparatively recently the only railway was the great trunk line adjacent to those territories. As administrator of Nyasaland, Sir Alfred Sharpe had full acquaintance with, and I feel sure he recognizes the great work that was done by, the British South Africa Company's many officials who have been carrying on the task of extending civilization in those regions, and in this connection I should like to refer to the late Mr. Codrington, who was originally recommended to the British South Africa Company by Sir Alfred Sharpe. He was followed by the present administrator, Mr. Wallace, who is well known to the Society, and has prepared the best map yet published of North-Eastern Rhodesia. I should like to endorse every word that has fallen from Sir Alfred Sharpe with regard to the policy that should be pursued to the native inhabitants. That policy has always been the policy of the British South Africa Company, and I regret

that it is not being to-day entirely followed in Nyasaland. There is one geographical fact that has interested me very much to which I should like to draw your attention, and that is the very peculiar conformation of those regions caused by the great rift which extends from the extreme north-west point of the Loangwe river, trends in a south-easterly direction, and then runs along the Zambezi to the Victoria falls. This is a very extraordinary fact that a trough extends across Africa at that point for a distance of about 700 miles. It is almost a straight line, and in many places both sides are precipitous; this has been one of the great difficulties which has affected the development of the regions of British Central Africa which lie to the east of that trough. It has made the extension of railways difficult, and will continue for many years to come to make the development of the eastern regions of North Rhodesia independent of that of the Western regions. It is that physical fact which makes us welcome the projects for railway extension that will, I hope, eventually end in the connection between Nyasaland and Beira, which has been mainly developed through the efforts of the British South Africa Company and Cecil Rhodes. You must pardon the enthusiasm of one who has devoted a great many years to the consideration of the problems of those regions in regard to which Sir Alfred Sharpe has addressed us to-night.

Mr. J. H. West Sheane: It is very kind of the chairman to refer to the work of Mr. Gouldsbury and myself, 'The Great Plateau of Northern Rhodesia,' and we thank you very much for your kind reference. I should like most heartily to endorse everything Sir Alfred Sharpe has said as regards the economic development of British Central Africa, and I would especially refer to that portion which he has not dealt with so specifically, that is the greater portion of British Central Africa—North-Eastern Rhodesia. The whole future of British Central Africa is bound up with the improvement of the transport facilities, and one may say that the whole welfare of the country depends on adequate railway construction. By the enterprise of the British South Africa Company, the southern part of North-Eastern Rhodesia has been rendered more accessible by the railway, which has been continued—the Katanga railway—from the Victoria Falls right up almost to touch Lake Bangweulu, and of course that helps the planters and other people to export their cotton from the southern portion of North-Eastern Rhodesia. It is to be hoped that the Shire Highlands railway that Sir Alfred Sharpe has outlined as possibly soon to be extended to Beira will do a great deal, not only for Nyasaland, but also for the adjacent part of North-Eastern Rhodesia. The rich soil of North-Eastern Rhodesia offers so many possibilities for the cultivation of tropical products that it is really difficult to select any special product which you can say will be a staple industry of the future. But one may confidently assert that in rubber and cotton we have two products which will each become a great industry of the future; and I would like to emphasize the fact especially that both rubber and cotton are indigenous. For instance, the Basenga tribe for many hundred years have cultivated good cotton. There are several thousand acres under cultivation in North-Eastern Rhodesia, and the results have been very successful indeed. The Abassi and Affifi varieties have been cultivated with very great success, and samples have been sent home recently and fetched up to the price of 1*s.* 2*d.* a lb., which I need hardly say is a very high price. One may turn now from cotton to the question of rubber. Landolphia vines are to be found in abundance all over the greater part of Northern Rhodesia, and why is this so? The reason is because the British South Africa Company have protected those vines during the last seven years by a Rubber Ordinance, and the vines are now developed. In the

Wemba district alone Mr. J. de Jong, of the Agricultural Department, recently reported upon five large rubber forests which he had visited. Mr. de Jong estimated that these forests were about 21,000 acres in extent and contained approximately some 800,000 vines. It would be easy to split up these forest areas and make them into payable rubber estates, and these natural Landolphia vines could easily with a little cultivation be developed into a very valuable asset. It must be remembered that not only are these natural assets available, but the planters have planted some 400 acres with Ceará rubber near Fort Jamieson, which is doing well. In conclusion, I would like to mention some of the other natural products, such as tobacco, gum copal, fibre, including sansieviera, and very valuable timber. All these things should ultimately prove of great value and ultimately great resources of the country.

Sir CLEMENT HILL: I think we have had a lecture and discussions to-night which are somewhat unusual in this hall; they belong not so much to absolute geography as to "applied" geography. You have seen to-night the results which flow from the efforts of explorers and what they have done in these out-of-the-way countries. You see from them that geography is not the dry study which some people think it, but that it is a real, practical, living study which leads up to these very great results which we have seen in the development of what is now Nyasaland, lately British Central Africa. I have been privileged to take part in the official development of that country with Sir Alfred Sharpe and Sir Harry Johnston. They are amongst the greatest modern geographers who have settled these questions, which, to use a Latin phrase, *Solvuntur ambulando:* they had to do it by walking, so that they should study with their geographical instincts and their geographical knowledge these countries which were then absolutely unknown to any of us. It is to them that we owe the development that now exists, and the possibility that the young men of this side can go and settle in safety and security and with the prospects of making money in the countries which were occupied solely by the slave-traders. I won't detain you for more than one word more, but I do not think that anybody should mention British Central Africa and its old days without alluding to the names of Horace Waller and Sir John Kirk. They shared the glory of the discovery with Livingstone; it was to them, with him, that we owe these discoveries. Sir John Kirk, though he has only recently resigned the Foreign Secretaryship of the Society, is still amongst us to help us by his advice and to guide us by his counsels. It is of material importance to ensure that travellers are certain of a good welcome here when they come home, and that the fruits of their labours will grow and ripen before us, and that we should learn how to profit by them and benefit by their examples.

Sir ALFRED SHARPE: With regard to what Mr. Wilson Fox said about Mr. Rhodes, I can only say I am with him down to the ground. I did not refer to Mr. Rhodes in detail in this paper because I did not want to go into history, and it was a geographical paper—"applied" geography, as Sir Clement Hill said. Perhaps I ought to have said more; if I ought, then I apologize humbly, and I can only say now that the whole of the expansion north of the Zambezi, not only in Nyasaland but in the north-east and north-west Rhodesia, and also the expansion which is going on in the Katanga portion of the Congo Free State, is due entirely to Mr. Cecil Rhodes—in the commencement, I mean. One other remark. I also agree with Mr. Wilson Fox in what he said as to native policy, as carried out in Northern Rhodesia, with regard to the treatment of natives. The lines on which this is carried out are practically those initiated by the late Mr. Codrington; and they could not be

better. One reason why I can say this is that my eldest son is a native commissioner in that country under the Chartered Company!

Sir LEWIS BEAUMONT: It only remains for me to say how much we have enjoyed and how much interested we have been in this lecture, and what a very happy inspiration it was of Sir Harry Johnston to address his remarks chiefly to telling us more of the lecturer than of what he had to say. There is no doubt that throughout the whole lecture it was quite evident that Sir Alfred Sharpe was keeping himself modestly in the background, and I think it was a very fortunate thing that Sir Harry Johnston let in the light upon so much that he has done. I am sure that I shall be expressing your wishes and voicing your feelings when I say that we thank Sir Alfred Sharpe most cordially for his very interesting and able lecture.

MEASUREMENT IN ECONOMIC GEOGRAPHY: ITS PRINCIPLES AND PRACTICE.

By B. C. WALLIS.

A WELL-KNOWN dictum of Lord Kelvin asserts that only when we are able to give quantitative expression to our conclusions do we really know something about our subject.

In the face of this dictum, it is perhaps a matter of surprise that geographers, especially those whose main work deals with economic geography, have not, as yet, attempted to make such measurements in their field of knowledge as will make it possible to state the facts of economic geography quantitatively. Elementary botany is descriptive and qualitative, more advanced work is quantitative and precise, and the most advanced work in botany involves greater precision and more accurate measurement. Economic geography is, at present, descriptive and qualitative.

In the realm of human activity which is surveyed by the geographer, not the least important area of investigation is that which is related to the world's work. It falls within the province of the economic geographer to state, regarding the raw materials of industry and the finished products of the factory, not only where they are produced, but why they are produced in such places, and there does not appear at this moment to exist any reasoned account which states how much is produced and why so much is produced at any place. The present attitude towards quantitative statements is solely one of *illustration*. When an author quotes numerical values he does so merely as suggestions of the importance of the matter in hand; he does not suggest that there is any element of constancy in his values, and as often as not he relegates them to a footnote. He states that such things occur at such and such places, and explains this distribution by reference to the great divisions of the world into natural regions; he fails to carry his work a stage further and to differentiate between different examples of the same region which produce the same articles in different degrees. It, therefore, appears that economic geography is ripe for fuller development; an illustration will make this clear. The geographer, as a man of science, is interested in the growing of cotton, for example, to

the extent that he desires to know where it is grown, why it is grown there, and also what is the ratio between the quantity grown in one place and that grown in other places, and, finally, why this ratio is maintained. His interest is in the constancy with which each region tends to produce a definite fraction of the world's cotton. So far he is in sympathy with the business man engaged in the cotton trade, but beyond this point their interests diverge.

The business man takes these constant proportions as a basic fact, and his further interest lies in the annual fluctuations about this constant, and the way in which these fluctuations will affect his business; the geographer also takes the constant proportions as a basic fact, but his further interest leads him to ignore the annual fluctuations and to explain in terms of regional geography the causes for the constant proportions which he observes. Consequently, it becomes a serious defect of method for the economic geographer to state his numerical values in the same form in which they occur in trade reports or in Government bluebooks.

By quoting numerical values in this way he fails to bring into prominence the main justification for the appeal to numbers at all. Crude statistics in millions of pounds sterling or in thousands of tons are not geographical; they are the raw material which it is the business of the geographer to transmute into constant values which can be expressed much more simply. There is little geographical value in the statement that the United States produced so many millions of pounds of raw cotton, either in a given year, or on the average for a given period; the geographer should state that at the present time the United States produce about three-fifths of the world's cotton constantly, so that he may explain why the United States produce this quantity in comparison with India, which produces but one-fifth of the world's cotton.

It is relevant to ask why this attitude of mind has not been adopted by the economic geographer, and the answer is not far to seek. The geographer, like the man in the street, appears often to have the impression that statistical data are useless and untrustworthy. They are untrustworthy since the numbers vary from year to year, and they are useless since the annual fluctuations vary in degree. Is this a cautious way of expressing the opinion of the average man that figures can be made to prove anything? There can be little doubt that a prejudice exists against the introduction of numerical values into the study of geography. It is time to inquire whether this prejudice is justified, whether such a prejudice militates against the scientific development of economic geography, and the whole matter rests upon the truth or otherwise of the statement that we can obtain numerical values which are constant and true. To this we must now turn.

A first suggestion that an element of constancy which is capable of measurement can be found may be obtained from the tables in the appendix to Mr. Chisholm's 'Handbook of Commercial Geography.' In these tables

the data are frequently expressed as percentages, and upon examination it will be found that these percentages vary very slightly from period to period. One or two examples will suffice; they are taken from the fifth edition, 1904, and refer to the periods, in averages for quinquennia, 1876–1880, 1881–1885, 1886–1890.

1. The value of the exports of cotton manufacturers from the United Kingdom as percentages of the total values of the exports of British and Irish produce—

28, 26, 25,

2. Exports of wine from France similarly—

7, 7, 7.

3. Exports of wheat from Russia similarly for five quinquennia ending 1881–85—

24, 27, 27, 27, 27.

4. Imports of cotton goods into Egypt as percentages of total imports—

20, 19, 17.

5. Imports into China from the United Kingdom as percentages of the total imports into China—

25, 24, 22.

6. Export of timber from Canada as percentages of the total exports from Canada—

21, 23, 22.

The consideration of the tables from which these illustrations are quoted leads to a working hypothesis: if statistical data be expressed as percentages on the average for short periods, the results obtained tend to be constant within an error of 5 per cent. We may therefore conclude—

(1) One-fourth of the exports of the United Kingdom consisted of cotton goods. (2) One-fourteenth of the French exports were wine. (3) One-fourth of the exports of Russia were wheat. (4) One-fifth of the imports into Egypt were cotton goods. (5) The United Kingdom supplied one-fourth of the goods imported into China. (6) One-fifth of the Canadian exports consisted of timber.

These statements involve constants, and are true for the period 1876–1890.

This evidence suffices to show that underneath the annual fluctuations there is a definite constancy which can be measured. The fluctuations are superficial and due to transient causes; there exists a more deep-seated, steady force tending to act continuously with approximately the same strength.

This permanent cause is laid bare by Mr. Chisholm's method of taking averages for quinquennia; and by approximating within an error of 5 per cent., constancy is achieved, and our conclusions may be stated numerically in the form of simple fractions. The use of a margin of error of 5 per cent. means that, in mathematical language, the data are correct to two significant figures; we reach two-figure accuracy.

The question naturally arises here whether we cannot attain a greater accuracy than this; but a moment's consideration will show that under present conditions greater accuracy is impossible. Governments do not collect statistical data either with sufficient uniformity or with sufficient care to justify greater accuracy in deductions from their returns. It is frequently necessary to calculate the equivalent weight of a certain number of bushels of wheat, since our data are in bushels and other data for foreign countries are in weights. If we take 60 lbs. as the weight of the bushel we introduce a possible error of 5 per cent., since wheat may weigh 63 lbs. per bushel. Again, many published data are estimated, not enumerated, and we can hardly expect greater accuracy than 5 per cent. in an estimate. The upshot of this is that for geographical purposes we gain nothing by using or quoting statistics tabulated to more than three significant figures; if we made calculations accurately within an error of 1 per cent. or less they would be still incorrect to an error of about 5 per cent., because the data with which we worked were inaccurate to that degree.

The illustrations quoted above dealt with trade and related to periods over twenty years ago; it will be well to consider other illustrations calculated from bluebooks in reference to more recent years.

1. About 1909 France produced one-tenth of the world's wheat; in the decade preceding 1909 the variation from this did not exceed a quantity equal to $\frac{1}{250}$ of the world's wheat.

2. The United States has produced a proportion of the world's maize varying from 72 per cent. to 78 per cent. during the period 1895–1909; *i.e.* the United States produces three-quarters of the world's maize.

3. Germany has produced from 32 per cent. to 34 per cent. of the world's crop of sugar beets during the period 1899–1909; *i.e.* Germany produces one-third of the world's beet sugar.

4. Australia has produced from 15 per cent. to 20 per cent. of the world's wool during the period 1893–1909; *i.e.* Australia produces one-fifth of the world's wool.

5. Similarly Germany has produced two-ninths, the United Kingdom one-fifth, and the United States two-fifths of the world's production of pig iron during the period 1899–1909.

These illustrations, which might be extended in scope and number, demonstrate clearly that the working hypothesis stated above is justified by experience, and we may therefore consider the consequences which would follow its adoption.

The first consequence would be a distinct gain in precision; instead of using the phrases "extensively grown," "largely produced," "much," etc., the geographer would use simple fractions. The second consequence is more important, since we should cease to use numbers as illustrations, and should cease to quote statistical data correct to six significant figures, and should adopt the numerical statement in a simple form as the *basic*

fact from which to make our deductions and generalizations. Instead of asking ourselves, "Why is coffee largely grown in Brazil?" we should ask, "How is it that Brazil produces four-fifths of the world's coffee?"

One interesting result would appear in connection with minerals. It is the business of the economic geologist to describe the situation of mineral deposits. It is not his business to consider the relation of these deposits to man—that is the province of the economic geographer—yet we find text-books and atlases failing to do more than repeat the evidence collected by the geologist; they demonstrate a fact in geology, not geography. Provided we discover the places in which minerals are worked, and the relative importance of each place in regard to the other places where the same mineral is worked; provided we substitute for the statement, "Coal is extensively mined in India, Canada, Japan, and Australia," the statement, "Coal is mined to the extent of 1 per cent. of the world's production in India, Japan, Australia, and Canada," we are correctly functioning as geographers. Our business is not the Earth as a planet, but the Earth as the home of man, and our care is not the rocks of the Earth's crust, but the reaction between those rocks and man who turns them to his purposes.

DR. NANSEN ON NORTH POLAR EXPLORATION.*

By Sir CLEMENTS R. MARKHAM, K.C.B., F.R.S.

THE publication of the great work of Sir Fridtjof Nansen is an epoch in the unfolding of Arctic history. His object is "to make clear the main features in the development of the knowledge of the north in early times"; and, as has always been his wont, "when he seriously took the work in hand, the subject monopolized his whole power." Nansen drew the veil from the mystery of Arctic geography; he now draws the veil from the mystery of early Arctic history.

The first information respecting the far north came to the civilized world through the trade in tin and in amber; but it was all vague and misty. The position of the Cassiterides, or tin islands, was and remains uncertain. Nansen is disposed to place them on the south coast of Brittany, on islands where tin occurs. Still less was known about the sources of the amber supply.

Pytheas, the Phocæan Greek of Marseilles, is the very "first who gives firm foothold," in the days of Alexander the Great, about 330 B.C.

I was myself so deeply impressed by the greatness of Pytheas as a scientific geographer and a northern explorer, that I published a monograph on his voyages in our *Journal*, nearly twenty years ago. Nansen

---

* 'In Northern Mists: Arctic Exploration in Early Times.' By Fridtjof Nansen, G.C.V.O., ETC. 2 vols., pp. 766. W. Heinemann: 1911.

has studied all the authorities on the subject with care and thoroughness, and fully agrees with me. Pytheas, he holds, was an eminent astronomer, and the first to introduce astronomical measurements for ascertaining the geographical positions of places, therefore the first scientific explorer, an intrepid seaman, "and one of the most capable and undaunted discoverers the world has ever seen." Above all, Pytheas was the first to bring authentic information respecting the Arctic regions. Nansen takes him further than I did, believing that he actually made the voyage from the Shetlands to Thule, which is the coast of Norway. He may even have seen the midnight sun, and he received information respecting the ice-floes and the frozen Arctic seas.

Pytheas was the first scientific explorer. Eratosthenes, 150 years later, was the founder of scientific geography, a science with a clearly stated definition now more than 2000 years old. For geography is the mother of all the sciences. Among other achievements, Pytheas was the discoverer of this island of Britain. He had no successor for centuries, but stands alone—the first scientific explorer, the first Arctic discoverer.

There was an expedition towards the north in the time of Augustus, and a voyage of discovery despatched by the great general Agricola. But it was our own King Alfred who first gave a detailed account of part of the Arctic Regions in his edition of Orosius, by recording his conversations with the explorer Ohthere or Ottar. Nansen has found this narrative of the great king very useful. It has enabled him, in his two very interesting chapters on the Finns or Lapps, to compare the prosperous condition of these dwellers on the Arctic threshold in Alfred's time with their present degeneration, due to the curse of modern civilization. In the end of the twelfth century, Spitsbergen appears to have been discovered under the name of "Swabard"; and there is, in one of these Finnish chapters, an account of the maelstrom and of the voyage of Harald Hardrada.

It is strange that the Irish monks, seeking neither fame nor knowledge nor gain, but only solitude, should have preceded the Norsemen in the Færos and in Iceland, but so it was.

"The Norwegians were the first people who definitely abandoned coast sailing, universally practised before their time, taking navigation away from the coast and out on the ocean." This dictum is undeniable, and is one of the glories of the Norwegian people. They crossed the North sea to Britain, Ireland, Orkneys, Shetlands, Færos, and Iceland; and the Atlantic to Greenland and America. Nansen gives good reasons for the belief that their voyages, at least across the North sea, date from a very remote past, certainly from before the time of Pytheas.

An excellent account of the Norse ships, the swift long ships for war, and the broader sailing merchant ships (*bosses* or *knars*), precedes Nansen's account of the Icelandic and Greenland discoveries by the Norsemen. The story of the settlement of Iceland in the ninth century is admirably told, followed by the narrative of Eric Raude's discovery of and settlement

in Greenland, and its success. Settlers followed in his wake until there was a Norse population of nearly 2000, with 280 homesteads and four churches up the deep fjords, sheep and cattle housed in the winter, and a flourishing trade with the mother countries.

Nansen's object, in this part of the work, is to disentangle truth from fiction. He fully accepts the history of the settlement of Eric Raude, and the discovery of America represented by Helluland (Labrador) and Markland (Newfoundland), and he finds evidence that Markland was visited for wood-cutting, occasionally and down to a late period. He records also the approaches to the east coast of Greenland, comparing the descriptions in the sagas of the glaciers reaching to the sea and of the formidable ice-floes, with his own experiences and observations on the same forbidding seas. He tells of the arrival of that famous lady Gudrid with her father, of her marriage with Karlsefne, the knight-errant, and of their departure from Greenland for the discovery of America. Our author might well have inserted the extremely interesting episode of Gudrid and the sorceress, for nowhere throughout the saga literature is there a more graphic and detailed account of a heathen ceremony, with all the local colouring. Nansen also discusses the furthest northern point in Baffin bay reached by the Norsemen, from Staumsfjord (66° 30′ N.), or Kroksfjardarhaidr (Disc. 70° 30′ N.). That in about 1300 A.D. they had reached 72° 55′ is proved, beyond dispute, by the runic inscription found at Kingigtorsuak. There is also mention of an expedition when the latitude was attempted to be observed by a peculiar method which gives no certain result to us. Nansen is not disposed to concede any very high latitude to the Norsemen in these voyages. I am inclined to be more liberal, and to think that Lancaster sound and even Washington Irving island are not impossible.

All this wonderful story of the settlement of Greenland and discovery of America by the Norsemen is accepted by Nansen as, in the main, historical. He holds the voyage of Erik Raude "to be the most remarkable in the history of Arctic expeditions, both in itself, on account of the masterly ability it shows, and for the vast consequences it was to have."

But legend had been mixed with veracious tradition in the stories handed down to the writers of the sagas who lived three centuries after the events. It required the aid of untiring research and very keen insight to unravel truth from fiction. The story of Wineland the Good, with its vineyards and self-sown wheatfields, could not be accepted, and our author diligently sought an explanation of its presence. The task was a difficult one, and some assistance was obtained from Prof. Moltke Moe, whose profound knowledge of the folklore of the northern countries and varied learning is unsurpassed.

The Wineland story was first received by the historian Adam of Bremen from Svend Estridsen, the King of Denmark, who was famous for his knowledge of Scandinavian traditions. This was in the middle

of the eleventh century. There is evidence that the legend reached Iceland almost as early. Nansen, after much research, found that, in one of the works of St. Isidore, the learned Bishop of Seville in the time of the later Gothic kings of Spain, described the "Fortunate Isles" in the same way as the Icelandic sagamen described Wineland, as a country of vines and self-sown wheatfields. He judged that the coincidence could not be fortuitous. Further research led him to the conclusion that the legend of St. Isidore reached Iceland through the medium of Irish tradition. The "Fortunate Isles" of St. Isidore were the "*Insula uvarum*" in the "Navigatio Sancti Brandani," and the *Brazil* Island or Isle of Happiness of Irish tradition was an idea derived from the Fortunate Isles of St. Isidore, eventually reaching Are Frode and the learned men of Iceland. Nansen adds corroborative evidence, and the whole explanation of the origin of the Wineland legend is elaborated by our author after untiring research and with remarkable literary skill. He has thus separated legend from what may be received as history.

Nansen takes a common-sense view of the decline and final disappearance of the Norse settlements in Greenland. It was not change of climate, for the climate was exactly the same then as it is now. It was not the black death, for there is not an atom of evidence that the disease ever reached Greenland. It was not a war of extermination waged by the Eskimo, for that unwarlike people could not move in large numbers, and, in fact, they had lived side by side with the Norsemen during the whole time. Recent research has established the fact that the Eskimo were in Greenland centuries before the Norsemen arrived. The cause of the disappearance was the falling off and final cessation of communication with Norway. The later kings of that country only allowed one ship to go to Greenland annually, and it was sometimes wrecked. In 1410 communication ceased altogether. By that time many of the settlers had doubtless returned to Norway. The remnant could not keep their cattle and sheep alive. They were finally obliged to adopt the Eskimo mode of life, and became absorbed in them. Their vestiges are numerous, consisting of the sites of their homesteads, a ruin of a large church, two inscribed gravestones, and a few Norse words in the Eskimo language. It was a very melancholy conclusion of a great enterprise.

Nansen sets little store by the sailing directions of Ivar Bardsen, either as regards their authenticity or their accuracy, for only a third-hand version has reached us.

The indefatigable researches of our author has brought to light the fact that there was a correspondence between Alfonso V. of Portugal and Christian I. of Denmark, in which the former advised the Danish king to despatch a voyage of discovery.* In fact, Skipper Didrik Pining, a

* In 1909 a letter from Carsten Grip, of Kiel, to Christian III., dated March 3, 1551, was discovered, in which it is stated that Pining was sent out by Christian I., to make discoveries, at the request of Alfonso V. of Portugal. Both kings died in

great sea captain and pirate, was sent, and probably reached Greenland. This must have been before 1481, the year in which both the kings died.

A very important chapter is devoted to a survey of the knowledge respecting the northern countries during the middle ages, as shown chiefly by maps. It commences with the knowledge acquired by the Arab geographers, in which research Nansen was assisted by Prof. Seippel. A very able review of the information to be gleaned from the maps of the middle ages follows. Our countryman, Nicholas of Lynn, who was in Norway and the northern islands, is referred to with respect by Nansen, as having observed for latitudes with an astrolabe. But his book is lost, and we only know him from Chaucer, and from brief notices by Mercator and Hakluyt. Nansen makes short work of the supposed Zeni voyage, which had such lasting and misleading influence on the work of later cartographers. The Zeni voyage, he says, is a fabrication from several earlier maps.

The work concludes with the early voyages in search of the Isle of Brazil from Bristol, the voyage of John Cabot, and the Portuguese voyages of the two Corte Real brothers. Nansen thinks that Cabot never returned from his second voyage, a misfortune which would account for the silence respecting it. He gives full extracts from the news letters of Pasqualigo, Soncino, and Cantino, which comprise all that is known of the voyages of Cabot and the two Corte-Reals. If Nansen's conjecture is correct respecting Cabot, and it accounts for much, all three naval worthies, like La Perouse and Franklin, found graves in the midst of their discoveries.

It is impossible to speak too highly of the value of this admirable work. For thoroughness of research, combined with literary skill, and keen insight, it has not been surpassed. Nansen has proved himself to be a great historian as well as a great explorer.

My friend manfully defends the usefulness and importance of polar exploration. The 'King's Mirror,' that grand old Norwegian chronicle, gives three motives for Arctic voyages—the desire for gain, the desire for knowledge, and, highest of all, the desire for fame. Nansen, referring to these motives, dwells on the power of the unknown over the minds of men. That motive tempers the human will for the conquest of difficulties. It has furnished a school of manliness and self-conquest in the midst of the slackness of varying ages. The sea-power and imperial dominion of England drew their vigour from the love of enterprise, the longing to solve the problems of the unknown.

1481. The discovery of this correspondence would be very interesting. Senhor Pedro d'Azevedo, assistant "conservador" at the Torre do Tumbo in Lisbon, kindly made a search for me in the archives of King Alfonso V., but could find nothing. He suggests that the presence in Lisbon of a Dane (mentioned by Azurara) at that time may have led to the correspondence.

MISS SEMPLE ON THE INFLUENCES OF GEOGRAPHICAL ENVIRONMENT.*

By GEO. G. CHISHOLM, M.A., B.Sc., Lecturer on Geography, University of Edinburgh.

THERE can be little hesitation in pronouncing this the most notable work that has yet appeared in English on the subject to which it is devoted. The nature of that subject is hardly indicated with sufficient preciseness by the general title, the supplement to which, stating that it is on the basis of Ratzel's system of Anthropogeography, gives the limitation in the range of the influences contemplated in the work. It is the influences on man with which it deals. That being so, the only English work that can be fairly compared with it is Buckle's 'History of Civilization in England,' and this comparison serves to bring into relief the important advance in the point of view resulting from making geography rather than history the foundation of the investigation. Though Buckle was dominated by the idea of the all-compelling influence of natural conditions on human history, he was content with an imperfect survey of those influences, and, keeping his mind too firmly fixed on the influences immediately under review, was tempted to exaggerate the degree of influences purely local, and to make assertions as to the working of alleged influences with a confidence which his latest editor, Mr. J. M. Robertson, M.P.—an editor as candid as he is learned, exact, and acute—has frequent occasion to correct. On the other hand, comprehensiveness of survey is an essential requirement of geography, above all when it receives the broad treatment which was given to it by Ratzel, and which it again receives in the present work, and that wide outlook is the best corrective of generalizations built up on too narrow a basis.

The fact that Miss Semple's work is expressly based on the volumes of Ratzel above named, is no doubt the reason why these volumes are never cited among the authorities. The two works are not only to a very large extent similar in idea and arrangement, but multitudes of details in the English work are taken direct from the German; but while that is so Miss Semple has handled all her material independently, where necessary modifying and remoulding her borrowings so as to suit her own scheme, and nearly always enriching the ideas of Ratzel by a wealth of illustration drawn from a variety of sources not available to him.

It is to the first of Ratzel's two volumes that Miss Semple's book most closely corresponds. There are, indeed, chapters in Miss Semple's work lacking in Ratzel, but most of the chapters of Ratzel's first volume have their counterpart in Miss Semple's, although in some cases the grouping of subjects is somewhat different, largely in consequence of the fuller treatment which Miss Semple has given to those subjects. The most

* 'Influences of Geographic Environment.' By Ellen Churchill Semple. New York: Henry Holt & Co.; London: Constable & Co. 1911.

important omission in Miss Semple's work as compared with the first volume of Ratzel is that of the chapter on the vegetable and animal worlds.

Though it is the first part of Ratzel's work that Miss Semple's corresponds to in the main, most of the important ideas in the second part have been incorporated by her where her own plan has afforded her an opportunity of doing so. It has to be remembered that the second part was not originally contemplated by the author. The first part was issued as a complete work with the idea that the subjects dealt with in the second were not yet ready for scientific treatment. Nevertheless, the second part contains at least one section—that on the structural works of men—to which, many will note with regret, there is no counterpart in Miss Semple's book. True, many of the general facts noticed in this section, as, for instance, some of the circumstances influencing the situation of towns, are appropriately enough referred to by Miss Semple in one or other of the chapters of her own volume; still, a systematic treatment of this part of her subject would have been welcome.

On the other hand, there is one chapter of Ratzel's which might perhaps have been omitted with advantage, or, if not the whole chapter, at least the introduction. The chapter referred to is that on Ratzel's somewhat confused and confusing idea of *Lage*, or geographical location, as our author renders it. In fact, the term is mostly used both by Ratzel and Miss Semple in its ordinary dictionary meaning to denote the relation of one place (city, region, territory, country, or whatever it may be) to others, and the endeavour to give it a special technical meaning leads only to obscurity. That the attempt should have been made is all the more remarkable since both Ratzel and Miss Semple give us incidentally elsewhere a classification of geographical subjects to which no exception can be taken. On p. 92 of Part I. of his 'Anthropogeographie' (2nd edit.), Ratzel, in speaking of the classification of the inhabitants of the Earth, remarks that "for Anthropogeography the classification according to geographical characters, that is to say, according to the situation and the nature (*Lage und Natur*) of their abodes, is the most obvious and natural;" and a similar summary of the field of geography is made by Miss Semple on p. 29, where she says that "environment means something more than local geographic conditions. It involves influences emanating from far beyond the borders."

So much being said by way of criticism, one cannot be too emphatic in expressing the value of this work to the student of geography. Every chapter bears testimony to the enormous industry which has been devoted to the collection of material and the marshalling of that material to illustrate its subject.

The first chapter, "The Operation of Geographic Factors in History," is essentially introductory. It indicates the dominant ideas of the book; it summarizes some of its leading conclusions; and it furnishes a number of the clearest instances of the fact and the importance of geographical

influences. Its concluding sentences state with pithy conciseness one of the most important lessons in the whole volume, one that has to be borne in mind, and is more or less reimpressed in every subsequent chapter, and one that sufficiently indicates the need for giving a special place to this branch of study. "Anthropogeographic problems," Miss Semple tells us, "are never simple. They must all be viewed in the long perspective of evolution and the historical past. They require allowance for the dominance of different geographic factors at different periods, and for a possible range of geographic influences wide as the Earth itself. In the investigation they call for painstaking analysis, and, above all, an open mind." Geographical influences acting on the inhabitants of a region or country vary in degree, and vary at different times; and this time element in the estimation of geographical influences, referred to again and again in subsequent chapters, is of peculiar importance in anthropogeography. For, after all, the operation of geographical influences is always a shorthand expression, meaning the operation of forces which are somehow or other connected with place, and in multitudes of cases we have to consider these as operating not merely on man, but through man, and therefore varying in accordance with the character and extent of the region where they operate, or with the nature of the local modifications effected by man whether intentionally or unintentionally. There may be changes within historical times in the nature of influences operating locally with which man has nothing to do, as in the silting up of harbours, the division or the obliteration of lakes, possibly even changes of climate; but assuredly great differences have been made by the clearing away of forests from mountain-sides, and other work of destruction wrought by man, and unquestionably, too, the whole history of America shows what an immense difference is made by the same geographical conditions operating through a native population and a population that settled there with the whole experience of Europe behind them.

In many cases one great merit of Miss Semple's work consists in the filling in of the shorthand expressions according to which influences are ascribed to place, but the wealth of instances drawn from her wide range of study is too great to allow of this being done in every case, and much of the value of the book for students consists in the fact that here we have a number of cases grouped together in such a manner as to make it certain that some influences associated with geographical conditions repeatedly come into operation, but yet that it is left to the student to find out what those causes are, and in what manner they have the local attachment indicated.

The second chapter is also of an introductory nature, dealing with "Classes of Geographic Influences," a chapter to which there is no counterpart in Ratzel. The influences are divided into four classes: the physical effects of environment, the psychical effects of environment, economic and social effects, and effects on movements of peoples. In the first two of

those classes we are concerned with the influences of the local geographical conditions. In the two others we have to do partly with effects on the spot, and partly with effects arising out of the relations between the areas whose inhabitants are affected and areas elsewhere. These two can hardly be regarded as mutually exclusive, for among the economic effects, we are told, are those affecting the possibilities of industry and commerce, and commerce in a later chapter is considered, justly, as a form of historical movement, and must therefore be included among the things belonging to the fourth class, which embraces the influences of the features of the Earth's surface in directing the movement and ultimate distribution of mankind (p. 43). In all these questions of movement we have to consider at once the relation between the places which form the origin and goal of movement and the local conditions of the intervening parts of the world.

Readers of this *Journal* are already acquainted with Miss Semple's admirable handling of one of the aspects in which her subject presents itself. The fascinating and stimulating articles on "Coast Peoples," on pp. 72 ff. and 170 ff. of vol. 31 of this *Journal*, form one of the chapters of the volume under review, except that in the book we have the advantage of two map illustrations and that of marginal headings for the paragraphs. Another difference will be differently appreciated by different people. In the *Journal* the references are at the bottom of the page. Miss Semple follows Ratzel's practice in putting the references at the end of the chapter. As this chapter will serve to illustrate Miss Semple's method of treatment, it will be enough to give here the subjects and sequence of the chapters, and to indicate some of the more striking ideas developed in some of them.

Chapter iii. treats of "Society and State in Relation to the Land." In it such topics as the political and social influences of geographical conditions, the influence of geographical lines of cleavage on the divisions between political parties (p. 53), the checks to economic and social development (p. 62), the density of population under different cultural and geographical conditions (p. 65), are dealt with. Perhaps the most important paragraphs in it are the final ones (pp. 67–69), in which Miss Semple (following Ratzel) shows how, in spite of appearances to the contrary, peoples as they advance in civilization become in some important respects more, not less, dependent on the land which they occupy.

The fourth chapter deals with "Movements of Peoples in their Geographical Significance." Starting from the fact of the universality of such movements (p. 74), and emphasizing the importance of the "lesser and more normal movements" as compared with the few conspicuous migrations of which history takes note (p. 76), Miss Semple goes on to treat of mobility as affected by advance in civilization (p. 84), and of war, slavery, commerce, and religion in relation to such movements (pp. 88–98), and then to point out two main results of such movements, differentiation and assimilation (p. 112), with the further result of the elimination of the unfit varieties, whether by extermination or absorption (pp. 118–119).

The fifth chapter is that already referred to on "Geographic Location," which from the comprehensive nature of its subject inevitably deals with a number of topics appropriately treated of in one or other of the following chapters, most of which are devoted to geographical influences as determined by different special place relations. The distinctive feature of this chapter may be said to be that it gives a synopsis of the different kinds of influences ascribable to place relations of different kinds —a situation between two continents, in a territory defined by well-marked natural boundaries, on the coast, in a territory having one kind of resources contiguous to another with complementary resources; situation near the centre of power or on the periphery, and so forth.

The sixth chapter, entitled "Geographic Area," almost inevitably repeats some of the ideas in chapter iv., as is shown by the occurrence in both of the headings "differentiation and area," "differentiation and isolation." Among the significant ideas of this chapter one may single out the references to the fact that the only ancient Greek State ever able to dominate the Balkan Peninsula was non-Hellenic Macedonia, after it had extended its boundaries to the Euxine and the Adriatic (p. 180); to the influence of the early exhaustion of game in the small mountain-walled valleys of Peru and Mexico and restricted districts of isthmian Central America in forcing on the development of agriculture and raising the people above the migratory or *essartage* stage (p. 182); to the fact that every race, people, and state has had the history of progress from a small to a large area (p. 185), that territorial expansion is always preceded by an extension of influence (p. 187); and to the different nature of expansion in new and old countries (p. 189).

The seventh chapter on "Geographical Boundaries" takes up one of the aspects of geographical location. It insists on the oscillating character of boundary-lines in boundary zones, which, rather than boundary-lines, are the features marked out by nature (pp. 204–208), discusses boundary zones as affording an index of growth or decline according as the political frontier shows evidence of advance or retreat therein (p. 210; compare p. 80 in chapter iv.); the value of barrier boundaries (p. 213); the cases in which frontier wastes have been purposely maintained between different states, and the dangers connected with this practice (pp. 216–219); the tendency of frontier territories to break off from the central authority (pp. 231–235), and other topics.

As to the eighth chapter on "Coast Peoples," the references already given to the *Journal* will suffice.

The ninth chapter is on "Oceans and Enclosed Seas," in which it is pointed out that the ocean, though it has long played the *rôle* of a means of union in universal history, was for many ages the most effective of barriers, and only late came to serve as a highway (p. 293). Natural conditions have made it, even with its enclosed seas, a free highway. Its vast size has been the basis of its neutrality, and all the attempts to make

now one, now another enclosed or semi-enclosed sea a *mare clausum* have failed (pp. 314–35).

Chapter x., on "Man's Relation to the Water," necessarily deals with many of the same topics as are touched on in the previous chapter and in subsequent chapters on rivers and island peoples, but it includes also the relation of man to water required for cultivation, in connection with which it points out that the deficient water-supply in the region of the Pueblo Indians forced them into the development of a higher civilization.

The "Anthropogeography of Rivers" is the title of the next chapter, which is a long and interesting one, containing such broad generalizations as that through the long reach of its rivers the Atlantic commands a land area twice as large as the Pacific, and by reason of this fundamental geographical advantage it will retain the historical predominance so early secured; that it is solely through the contrast in the character of their rivers that South America and Africa present extremes of accessibility and inaccessibility, etc.

Chapter xii. discusses "Continents and their Peninsulas," and with reference to the latter, after showing how they tend to become intermediaries between adjacent peoples, landward and seaward, and the special importance of intercontinental peninsulas in this respect, suggests as the explanation of the fact that Florida is an exception from this point of view, that the "extensive swamps made the central and southern portion of the peninsula inhospitable to colonization . . . and transformed it from a link into a barrier" (p. 406).

Chapter xiii. on "Island Peoples" is crammed with ideas all interesting, and if in some cases discussable, at least well worthy of discussion. Perhaps the feature on which most stress is laid is what the author calls the paradoxical influences of island habitats upon man. These influences, acting in two opposite directions, develop conservative and radical tendencies (pp. 412–434). Like other well-marked isolated areas, islands, where conditions are favourable to development at all, have the effect of hastening on maturity and even over-population, with the result that various methods are adopted as a remedy.

In chapter xiv., on "Plains, Steppes, and Deserts," we have, among other things, reference to the fact that in such areas minute differences, such as slight surface irregularities, and differences in soil resulting from differences in geological structure, exercise more marked effects than where the character of the features is less uniform (p. 480); to the fact that political expansion is the dominant characteristic of peoples of the plains, where the boundaries depend more upon the reach of authority than upon the character of the physical features (p. 482); to the fact that geographical contact between arid areas and moist river valleys, poverty and plenty, has made the history of the two inseparable (p. 407); to the mobility of pastoral nomads (*ibid.*), and the importance of that fact in history. Miss Semple thinks it safe to prophesy that a conspicuous part of the future

economic and cultural history of the dark continent will be the release of agricultural regions from nomads.

In the fifteenth chapter on "Mountain Barriers," we have several illustrations of the nature of the influences tending to fix the situation of towns and villages (pp. 527–529, and 549), and the persistent influences in history of mountain passes or valleys in highland regions (pp. 538–546).

The sixteenth chapter is on the "Influences of a Mountain Environment," and among the ideas prominently developed in it may be mentioned the relativity of geographical conditions as exhibited in mountainous regions, as shown, for example, by the fact that in Italy settlements first took place in the mountains, gradually extending down to the plains (pp. 561–563); further, the influence of mountains in the development of communal forms of property (p. 575); the difficulty of effecting political consolidation among mountain peoples and the general absence of national feeling among such peoples (pp. 590–592). The author also notes that the fact that plains possess what mountains lack is to be regarded as a fundamental fact of economic geography (p. 588).

The last chapter is one upon "Climate," a subject inevitably considered, as the author points out, incidentally in nearly all the preceding chapters, but now treated separately with the view of drawing attention to some of the less obvious influences of climate upon man. By way of illustration, one may note the striking observation with regard to what Miss Semple calls "the historical effect of compressed isotherms." "Nowhere else in the world," it is pointed out, "do the tropical and frigid climatic areas, as defined on the north and south by the annual isothermal lines of 20° C. and 0° C. respectively, lie so near together as in Labrador and Northern Florida. . . . This approximation of contrasted climatic districts in North America was an immense force in stimulating the early economic development of the Thirteen Colonies, and in maturing them to the point of political autonomy. It gave New England commerce command of a nearly tropical trade in the West Indies, of sub-tropical products in the southern colonies, in close proximity to all the contrasted products of a cold climate-dense northern forests for naval stores and timber, and an inexhaustible supply of fish from polar currents, which met the strong demand in Europe and the Antilles."

Finally, it should be mentioned that the volume is illustrated by twenty maps, and is provided with an excellent index.

AROUND THE DEAD SEA BY MOTOR BOAT.*

By JACOB E. SPAFFORD, of Jerusalem.

THE placing of a motor boat upon the Dead sea, in Palestine, should do not a little to assist in a more thorough and scientific exploration of the whole of this interesting region. Indeed, although this historic sheet of

* The plates are from photographs by the American Colony, Jerusalem.

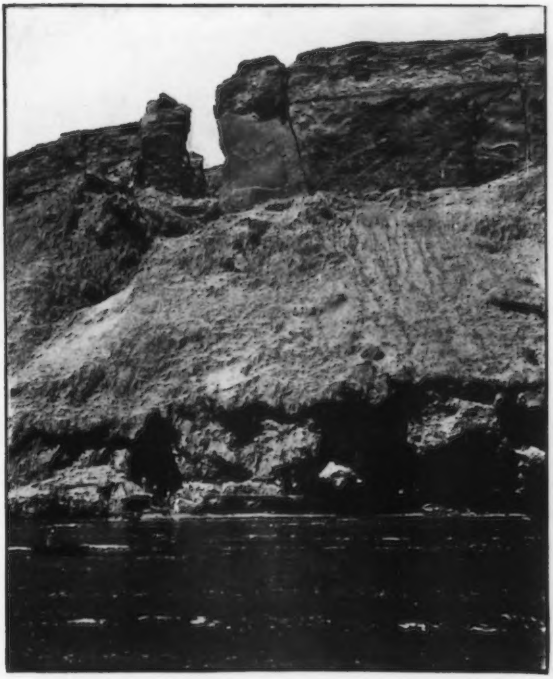
water, whose surface lies 1300 feet below that of the Mediterranean, is known by name to every one, its geographical interest is certainly far from having been exhausted. This being so, the writer, in collaboration with other members of the American colony in Jerusalem, who acted as photographers to the expedition, chartered the self-propelled vessel—a strange-looking craft and originally a sailing boat—and made a complete circuit of the sea.

In circumnavigating the lake, four or five very fertile little plains were met with. They were abundantly watered and capable of untold development, for as soon as one crop is harvested the water is turned on and another put in. These small plains are called Ghors—Ghor-el-Safieh at the south end; Ghor-Mera at the south-east angle of the lake; Ghor-el-Mizra at the end of the bay formed by the peninsula of the Lisan; and Ghor-el-Sawsineh, at the north-east angle of the sea. These plains naturally bring to mind the connection of the Dead sea with Sodom and Gomorrah, the "cities of the plain" that were overthrown. They have been variously placed on every side of the sea. The east side furnishes, at Calirrhoe, palpable evidence of volcanic upheaval, not to mention the combustible substances in sulphur, bitumen, or possibly oil that might have played a part in the overthrow of these ancient cities. Then, on the west side, we saw evidences of volcanic eruption in the black pumice stones, discovered near the tragic fortress of Masada.

These plains and the small oasis at Engedi are the only points where life of any kind and water is to be found. Engedi, our first stopping-place, is the only spot on the west side where fresh water is to be had. This evidently was a little paradise in the time of Solomon, and is frequently mentioned in the Old. Testament. Here the "coney" is to be found, as well as the ibex or wild goat, Engedi meaning "the spring of the wild goat." We also detected many specimens of the Shittim wood tree. Engedi lies about halfway down the west shore of the sea, and may, perhaps, have half a square mile of land sloping from the upper spring, whose temperature is 80° Fahr., and the small plain off the sea; it is watered by two other springs, and here the first cucumbers are raised for the Jerusalem market, which is reached in about eleven hours by land. At the time of our visit, the middle of June, there were only three men here waiting for the ripening of the millet that they might get away from the great heat to the higher levels.

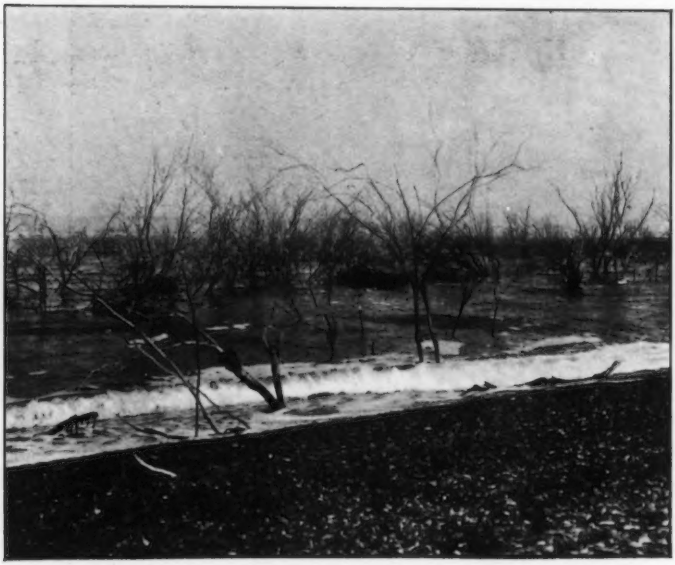
It is a very striking fact that the cliffs on the west side of the sea, which form an almost unbroken wall (excepting for the rugged torrent beds), and which vary from 300 to 1900 feet in height, are all of limestone, whereas on the east side of the lake the formation is entirely sandstone of exquisite hues. The abundance of water on this side, as compared with the other, is very striking, too.

About 10 miles from Engedi lies the peerless natural fortress of Masada (Sebbeh), first fortified by the Maccabees, then used as a place of refuge



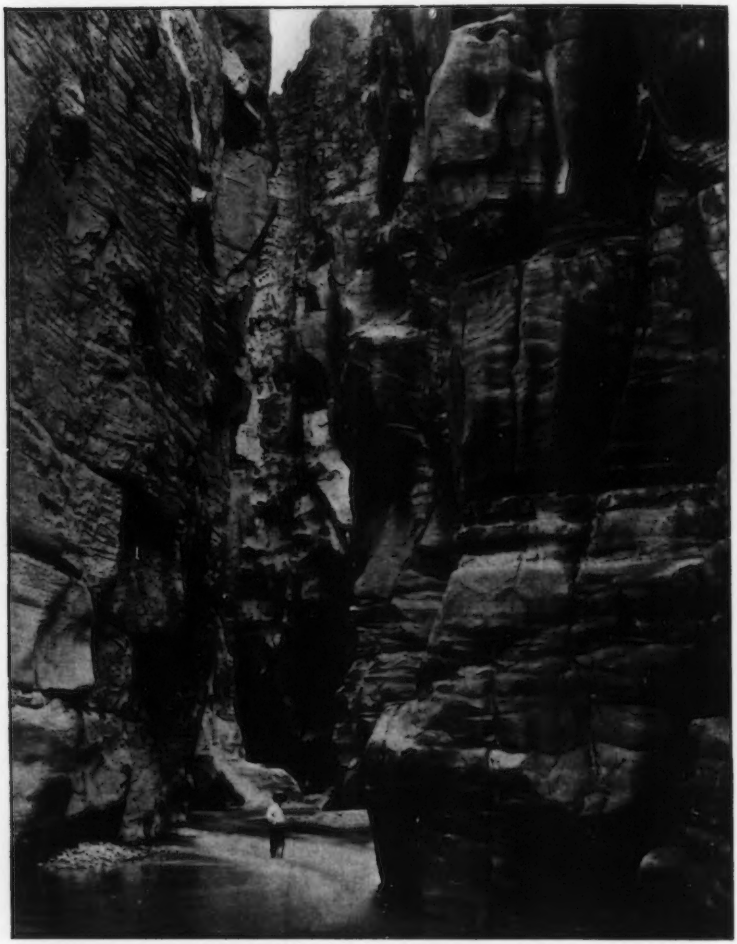
JEBAL USDUM, A MOUNTAIN OF SALT AT SOUTH END OF DEAD SEA, SHOWING MOUTH OF CAVE.

ANCIENT FORTRESS OF MASADA, ON THE WEST SHORE OF THE DEAD SEA.

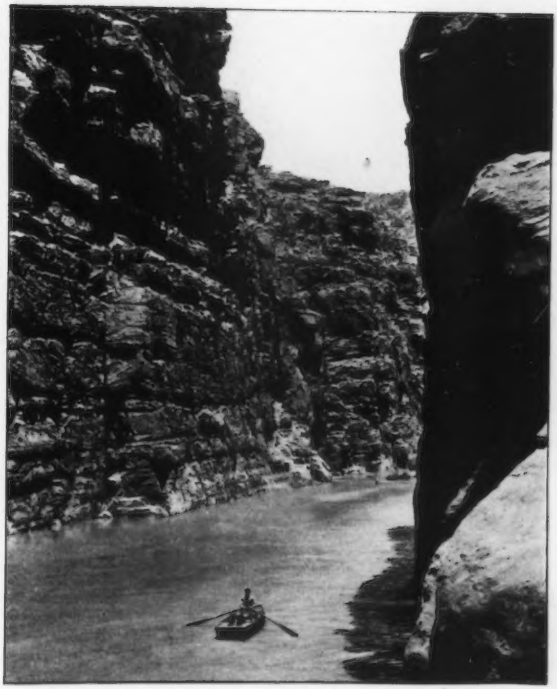


SUBMERGED FOREST ON WEST SHORE OF THE DEAD SEA, SHOWING HOW THE WATER IS ENCROACHING ON THE LAND.

LOOKING SOUTH, ON WEST SIDE OF DEAD SEA, FROM AM JIDDY (ENGEDI), WITH JEBUL USDUM IN THE FAR DISTANCE.



IN THE GORGE OF THE ARNON, NEAR THE SEA.



THE MOUTH OF THE ARNON, DEAD SEA.

by Herod, and finally immortalized by the flight thither and stand made by the Sicarii, or Zealots, in the vain hope of escaping subjection to the Romans when the country was subjugated by Titus. At the foot of the tableland, 2 miles from the sea, can be seen the Roman wall of circumvallation and the two Roman camps on either side of the small ravine. The fortress, which is 1700 feet above the sea, has steep sides at about an angle of 75°, and cannot be approached except from a connecting neck, called the Serpentine, at the south-west angle. A more inhospitable place or one more disadvantageous to besiegers could not be imagined.

Eight miles from here is Jebel Usdum, a mountain of rock salt rising to a height of 500 feet. In this mountain is a large cave, which we explored to the extent of about 200 yards, at which point a tapering cylindrical shaft of about 20 feet in diameter was discovered, piercing the solid rock salt 80 feet high, as though through polished marble, evidently the effects of the rain. This accounted for the fresh breeze that is constantly coursing through the cave, and for the unaccountable " river " of the native imagination, that flows through it intermittently. Great snow-white stalactites hung from the ceiling. The approach to this mountain presents most fantastic appearances of walls, buttresses, parapets, projecting towers, etc., caused by the stratification and lay of the salt boulders.

A little south of Masada, but at the lower end of the bay, on the eastern shore, lies the rich Ghor-el-Mizra. Here and elsewhere abounds the apple of Sodom, described by Josephus. It has the appearance of a beautiful fruit, but collapses and contains nothing but a little smoke-like dust and some smoke-like fibre. Here hot sulphur baths and abundant cold streams are met with within 5 feet of one another. The same is true of all the fertile oasis.

About 11 miles, going northward, the magnificent gorge of the river Arnon (Mojib), which separated the territory of Moab from Ammon, is reached. This certainly contains the finest natural scenery in Palestine. The sides of the canyon—which we penetrated for about half a mile, probably farther than any one else has yet explored it—rise perpendicularly about 300 feet and are only about 20 feet apart, here overhanging, there overlapping or dovetailing into one another, as though this mighty mass had been violently rent asunder to allow the seething stream of the Arnon with its cascades and whirlpools access to the sea. Words cannot describe, nor can the camera portray, much less the painter depict, the exhaustless variety and beauty of the veining and tracery in the richly shaded sandstone forming the side cliffs of this gorge. Just beyond this canyon there is a striking formation in the rock, looking very much like a stately queen's figure, silhouetted against the sky, which the natives call " Bint Sheikh Lut " (the daughter of Sheikh Lot), recalling Lot's wife.

About 8 miles further north lie the hot baths of Calirrhoe, famed for their connection with Herod, and where remains of his buildings may still be seen. Only a few feet apart lie the streams of hot and cold water.

These waters seem to be most salubrious, and are credited with medicinal virtues. This is a very volcanic region evidently. From the great clefts in the mountain-sides, where one can distinctly hear the bubbling of the flowing hot waters, rise clouds of steam. Here grows the argal, the so-called grape of Sodom. The Zerka, a stream almost as great as the Arnon and amid surroundings of much the same character, but having a small plain on the seashore that might very well be cultivated, flows into the sea 15 miles farther north. Here, as elsewhere, the wild oleander, with its beautiful pink flower, is abundant; also the reed, with its feathery tuft or bloom "shaken by the wind." Then here, on the east side, as well as on the west shore and south shore, evidences of the encroachment of the sea upon the land is very noticeable in the submerged forests of large trees still standing in the death-dealing waters. Here it may be noted that in connection with the increase of the rainfall noticed in Jerusalem since the Palestine Exploration Fund has kept the records since the year 1861—where, for the first ten years, the average was 21 inches and a fraction, for the next ten, over 24; for the next ten, over 28; and for the last ten, over 29—the peninsula recorded at the northern end of the sea on the maps and pictures of this region of twenty-five years ago, has turned into an island, to be in turn submerged and finally swallowed up.

Our trip lasted a week. We left Jerusalem at 3 p.m. on June 14 last, by carriage, arriving at the north end of the Dead sea at about 8 o'clock, where we spent the night. On Thursday, the 15th, we were on board with our luggage and effects by 5.30, and reached Engedi at 10.15 a.m. We remained here until the next day at 3 p.m., when we took up anchor and steamed southwards to Masada, which we reached at about 5 p.m. On Saturday, the 17th, at about 9.30 a.m., we arrived at Jebel Usdum. On Sunday morning we left Ghor-el-Safieh and reached Ghor-el-Mizra on the 18th, about noon. We started from here on the 19th, Monday, and arrived at the Arnon at sundown. The Zerka and Calirrhoe were visited on Wednesday morning, the 21st, and in the evening of that day we arrived at our starting-point. Every night was spent upon the boat, where no mosquitoes or sandflies troubled the party. The temperature, although over 100° Fahr., was tempered by soft breezes from the north and south, these being the prevailing winds.

LE VAILLANT'S GROTTO AT HEERENLOGEMENT.*

By Prof. H. H. W. PEARSON.

THE early South African travellers have left few permanent memorials of their journeys save in the form of their published writings or their collections of natural history specimens and other objects of interest. Their writings frequently are insufficient to determine with precision the

* Percy Sladen Memorial Expeditions in South-West Africa, Report No. 17.

route they followed, particularly through districts which were sparsely inhabited. Their halting-places are in very many cases described under names which have long ceased to be used or perhaps never were used save in the itineraries for the purposes of which they were invented. In regions like Namaqualand, where the few white inhabitants are for the most part descendants of families who settled there generations ago, and have been influenced but little by events in the greater world which lies beyond

Sketch showing the position of Le Vaillant's Grotto

their own horizon, there still linger traditions of the passage of Drège, Alexander, and other pioneers of the early part of the last century. The father of a man still living provided Alexander with additional oxen for his team; a farmhouse on the flanks of the Khamiesberg in which Drège stayed in 1830 is still standing. But of the travellers who preceded these even tradition is silent, and in the country through which they travelled the traces of their journeys are now very few.

In the eighteenth century, the traveller to Namaqualand going over-

land from Cape Town was offered the choice of two routes. One lay in the sand-belt parallel with the coast and not far from it, until the mouth of the Olifants river was passed. The eastern boundary of the sand-belt is formed by the range known as the Olifants river mountains, on the eastern side of which is the bed of the Olifants river. The second route passed along the eastern flanks of this range through the Olifants river valley. This route was discovered by the Dutch expedition led by Danckert in 1660. It provided a hard road, but it led over difficult mountain passes which, until comparatively recent times, seem to have kept the majority of travellers to the road through the heavy sand of the

THE MOUTH OF LE VAILLANT'S GROTTO.

coast belt. But the building of a reasonably good roadway over the Pickenier's pass, through the Olifants river-valley to Clanwilliam, and thence to Van Rhyns Dorp has taken the traffic out of the sand-belt, and the old route has for many years past fallen into disuse; it is, however, now being reopened by the gradual advance of the Malmesbury railway from the old terminus at Piquetberg towards Van Rhyns Dorp. The railhead, at the moment at Graafwater in the Jakhals river-bed (see sketch-map), is situated not far from the road followed by Le Vaillant in the eighteenth century, in his journey through Piquetberg to the Olifants river mouth, and thence into Namaqualand.*

* 'New Travels into the Interior Parts of Africa by the way of the Cape of Good Hope in the years 1783, 84, and 85.' Translated from the French of Le Vaillant. London: 1796.

On his way from Piquetberg northwards, Le Vaillant experienced great difficulty from want of water and ignorance of the road. He stopped at Lange Vlei, a "plantation" in a "sandy and miserable" district not far from the coast, almost midway between Cape Deseada and Lambert's bay. Further on he found "nothing but a sandy desert covered with briers and rushes" (in which Graafwater lies), which he traversed on his way to Heerenlogement. Of this place he had received information as unreliable as that which the unwary traveller in Namaqualand frequently

BACK WALL OF LE VAILLANT'S GROTTO, SHOWING *FICUS CORDATA*.

receives to-day. He was led to expect "a very abundant spring of water, a most agreeable retreat, and groves and grottos covered with inscriptions and figures." When he reached it, "its waters were soon rendered turbid by my Hottentots and cattle. With regard to the grotto, the inscriptions, the creeping shrubs hanging in festoons, all these like a dream vanished on our approach. I saw only a large cavern which served to shelter me and my caravan. It was spacious and lofty; and being open at the east,*

* A translator's error. In the French edition the cave is correctly described as opening towards the west.

we were covered without being shut up in it. Situated upon a small mount, it overlooked on one side my camp and the plain, . . . and on the other was joined to an immense chain of dry mountains extending in the form of an amphitheatre." It must be said that the description is inaccurate in some details, and the print which illustrates the scene * bears very little resemblance to it. He proceeds, "I made preparations for passing the night in the grotto; but I was obliged to share it with jackdaws and wood-pigeons; which repaired to it at the close of the day and perched in hundreds on a tree, the roots of which were implanted in an enormous crevice, while one of its branches overspread the floor of this natural hall. The figures and inscriptions consisted only of a few caricatures of the elephant and ostrich, with the names of three or four travellers who had probably stopped here formerly, like myself, to refresh themselves." He stayed at Heerenlogement for seven days. "At length, however, on the fourth of July . . . I quitted the place, *after having left my name and the date of my arrival in the grotto*, according to the custom of proceding travellers."

A more accurate account of the cave is given by Alexander.† On his way westwards to Walfish bay in the latter end of the year 1836, he visited Heerenlogement, "where was a pool of water under a hill, some distance up which is a large and open cave or kliphais. A small tree grows out of the fissure in the rock above and partly overshadows the cave, whilst on the north side is carved the names of travellers and hunters from the year 1712 to recent periods. Among others conspicuous is that of the renowned

'F. VAILANT, 1783.'

Looking from the cave in a westerly direction, the eye ranges over a wide extent of plain in which bushes are scattered."

The cave at Heerenlogement was visited by the writer in September last, in the course of a Percy Sladen Memorial Expedition to the Khamiesberg. The sandstone which forms its walls and roof is very friable, and there are abundant signs that its area is diminishing by reason of the breaking away of rock at the entrance. It is used as a shelter for stock, and some of the inscriptions are so worn down by friction that they are now almost obliterated, and of the few who have visited it in recent years a considerable proportion have felt impelled to inscribe or paint their own names on the walls at the risk of confusing the earlier and more interesting records. The situation of the cave renders any adequate measure of protection exceedingly difficult, if not impossible, and there is every probability that before many years have passed it will have lost the principal feature of the interest which it possesses to-day. It there-

* Le Vaillant, *loc. cit.*, vol. 1, p. 216.

† J. E. Alexander, 'An Expedition into the Interior of Africa,' etc. London: 1838.

fore seemed desirable to place on record the fact that the name which Le Vaillant carved on the wall in the week ending July 4, 1783, is probably as distinct in 1911 as it was when Alexander saw it in 1836.

The first photograph shows the mouth of the cave about 100 feet above the base of the hill. In the second is seen its eastern wall, from a large crevice in which there emerges a well-grown tree of *Ficus cordata*. There is little doubt that this is a part of the same individual as that described by Alexander, and it is probable that the main branches are those which he saw. It is not, however, the only Ficus stock in the cave, and although the crevice in which it grows is the

INSCRIPTIONS ON THE NORTH WALL OF LE VAILLANT'S GROTTO.

only one to which Le Vaillant's epithet "enormous" could be applied, it is, perhaps, not safe to assume that the tree at present existing is the one on which the jackdaws and pigeons perched in July, 1783. There is, however, no *à priori* improbability in this, for it is well known that species of Ficus do attain a great age. This is probably the nearest approach that there is to definite evidence as to the rate of growth of the common Namaqualand fig, *F. cordata*. If this is Le Vaillant's identical tree, it can have increased but little either in the diameter or spread of its branches within the period of a century. The third photograph shows a view of the north wall as seen from the middle of the cave. The name "F. Vailant," with the date 1783, stands near the centre.* Immediately above it is that of *K. Zegher*, the famous botanical

* It is said that Le Vaillant was not highly educated, which might be inferred from the fact that he has misspelled his own name.

collector. The partnership between C. F. Ecklen and K. Zegher, which did so much to increase the knowledge of South African vegetation, was entered into when the former returned to the Cape after a visit to Europe to dispose of his earlier collections. In 1829, while Ecklen visited the eastern parts of Cape Colony and Kaffirland, Zegher went northwards to Clanwilliam, the Olifants river, and the Cedarbergen, and thence to Namaqualand, the Khamiesberg, and the valley of the Orange river. This journey would give him the opportunity of visiting Heerenlogement by the same route from Clanwilliam as was later followed by Alexander. It is interesting to note that Alexander himself resisted the temptation to leave a similar record of his visit. The date 1712, to which he refers in the description quoted, is seen above Zegher's inscription, but it is not now possible to be certain of the name to which it belongs. The "few caricatures of the elephant and ostrich" seen by Le Vaillant may have been Bushman drawings; they are no longer recognizable.

Other names of interest are those of "W. F. J. Baron von Ludwig, 1853"—a well-known plant-collector and cultivator, the founder of a private botanic garden in Cape Town; and "A. G. Bain, 1854," a pioneer worker on the geology of South Africa.

The comparatively excellent water-supply at Heerenlogement made it an important place of call on the old road to the north, and in former times it must have been visited by the great majority of the travellers between Cape Town and Namaqualand. According to local tradition, there is in its neighbourhood a relic of an expedition which preceded that of Le Vaillant by nearly a century. Almost the largest exploring party that has ever left Cape Town for the interior was that of Governor Van der Still, which numbered no less than sixty-two persons, of whom fifty-seven were Europeans. The principal object of the expedition was to extend the existing knowledge of the geography of Namaqualand and the districts to the south of it, and, in particular, to locate the copper-bearing rocks which were known to occur to the north of the Olifants river. It has even been claimed that Van der Still saw the Orange river. This, however, is improbable, though his inquiries undoubtedly first established the fact of its existence. This large party, with an equipage consisting "of a calish drawn by 6 horses; of 8 asses, saddle-horses, 2 field-pieces, 8 carts, 7 waggons, one boat, and 289 draught and pack oxen, together with 6 other waggons, each drawn by 8 oxen," travelled northwards by way of the Olifants river-valley, and must, therefore, have passed to the east of Heerenlogement. On their return, however, they came south through the sand-belt, and, having crossed the Olifants river, made for Lambert bay, a line which would probably bring them into the close vicinity of Heerenlogement. There now lie in the sand, a few miles from this place, the broken pieces of a large iron pot which tradition asserts was a cooking-utensil used by the Van der Still expedition. According to the description, it resembles the pot which is still in general use for

culinary purposes among the natives, South Africa, but so large that while still whole it was employed as a tank for sheep-dipping. There are so few traditions of this kind among the inhabitants of Namaqualand that the story has an air of probability, though it must be remembered than an even larger expedition—that of Hendrik Hoff, of which the botanist J. A. Auge was a member—passed through the same district seventy-five years later. The pot has recently been purchased from the farmer on whose land it lies, and it will probably soon be moved into a more accessible place where its claims to be regarded as a relic of the great journey of Van der Still can be properly appreciated.

BASE-MEASURING APPARATUS.*

I.

By Sir DAVID GILL, K.C.B., F.R.S.

SIR DAVID GILL described a 4-metre comparator which had been designed by him for the Government of India and constructed by the Cambridge Scientific Instrument Company. This apparatus was designed for the purpose of comparing standards of all lengths up to 4 metres and including the determination of their absolute coefficients of expansion by heat.

The 4-metre comparator of the International Bureau of Weights and Measures at the Pavillon de Breteuil, Sevres is arranged for the determination of temperature coefficients of standards of 4 metres only, and the 4-metre comparator of the National Physical Laboratory at Teddington only permits the intercomparison of two bars which are at the same temperature, but does not permit the determination of their coefficients of expansion except by comparison with another standard whose temperature coefficients have been independently determined. In neither of these establishments were means provided for the *automatic* maintenance of temperature in the comparator-tanks, but that is provided for in the Indian comparator. The microscopes can be clamped at any points along an iron beam supported on two brick piers. This beam consists of a hollow cast-iron box about a foot square and about 15 feet in length, which is filled with water and covered with non-conducting material, so that it changes its temperature very slowly.

There are two long copper-lined tanks of teak upon a travelling carriage which can be moved at right angles to the direction of this beam. Of these No. 1 is a simple box lined with copper in which one bar (resting on a supporting beam fitted with slow motions) is immersed in water nearly at the temperature of the surrounding air. The other tank, No. 2, is a double one, the water in the outer tank being connected with electro-heating arrangements and a thermostat, so that it can be continually supplied with water at a constant temperature, which water communicates its heat by conduction to the interior tank through the copper sides of the latter.

There are three electro motor-driven pumps of one-quarter horse-power each, which circulates the water in the inner and outer compartments of Tank No. 2 and in the constant-temperature Tank No. 1, changing the whole water in each tank every 90 seconds. In this way a uniform temperature throughout each

* Research Department, November 16, 1911.

tank is maintained within $\pm 0°{\cdot}02$ C. or $\pm 0°{\cdot}03$ C. The water which circulates in the outer tank of No. 2, when coming from the tank, passes first through a well-lagged metallic box in which are fixed a number of thin copper double partitions which contain resistance-coils surrounded by oil. An electro current, of rather lower energy than that which is necessary to maintain the required temperature in the outer tank, passes through these coils, and thus heat is communicated to the water passing through the box. There is besides this a shunt current acted on by a relay. The water, after passing through the heating box, then enters the thermostat, which is simply a mercurial thermometer having a bulb composed of a number of thin steel hollow cylindrical bulbs filled with mercury and terminating in a glass tube having an internal diameter of about $\frac{1}{2}$ mm. The change of temperature of the surrounding water causes the mercury in this tube to rise about 40 mm. per degree Centigrade. The height of mercury in this small tube can be adjusted by a steel diaphragm (like that of an aneroid barometer) that is pressed upon by a screw so that the height of the mercury in the glass tube can be adjusted for any temperature. There is in this tube a platinum wire, the point of which, when it comes in contact with the mercury, establishes an electric circuit with the relay, and when this relay acts a portion of the passing electric current is cut off. Thus the temperature of the water entering the outer box is somewhat diminished, then the mercury falls in the glass tube, the relay circuit is broken, the extra supply of current is restored, and the temperature of the water is raised. This alternate automatic make and break of the heating circuit very accurately maintains the temperature of the water. As at Dehra Dun the temperature of the laboratory is generally lower than that at which bases are measured, no arrangements are necessary for automatically maintaining the temperature in the bar tanks lower than that of the surrounding air of the laboratory.

Sir David Gill also exhibited photographs of a 24-metre comparator (for comparing the lengths of 24-metre invar wires or tapes with a standard 4-metre invar bar) which had also been constructed to his design by the Cambridge Scientific Instrument Company. The whole apparatus rests upon a long low wall of about 2 feet in thickness; to this wall are attached 7 cast-iron uprights supporting microscopes and referring points. The mutual distance between these referring points can be rapidly measured by the 4-metre bar, which is mounted on an iron travelling carriage that runs upon rails fitted with adjustment which permits of very accurate alignment. The whole is so arranged that a complete comparison between the 24-metre distance with six successive lengths of a 4-metre invar bar can be made in less than ten minutes with an accuracy far exceeding a millionth part of the total length.

II.

INVAR TAPES.

By J. A. AGAR BAUGH.

Invar is the name of an alloy of nickel and steel which has the smallest known coefficient of expansion. It was invented by Dr. Ch. Ed. Guillaume, of the Bureau International des Poids et Mesures at Sevres, near Paris, after considerable research.

Invar was at first only obtainable in the form of rods, bars, and wire. After several costly experiments, we have succeeded in getting it rolled into tape, The bars have to be specially prepared and treated, otherwise the whole batch may be easily spoiled. It is necessary to artificially age invar tapes. The

National Physical Laboratory carry out this work in a special oven. It is usual to keep the tapes at 100° C. for a few days, and then allow them to cool very gradually, the period of cooling in some cases being as long as ten weeks. Ageing slightly alters both the length and the coefficient of expansion. Even after ageing invar tapes undergo some small changes in length. For instance, five invar tapes were restandardized after six months' use in the field, and were found to have lengthened as follows:—

No. 437	lengthened	0·027	mm. or 1 part in		852,000
,, 438	,,	0·081	,,	,,	617,000
,, 439	,,	0·056	,,	,,	893,000
,, 440	,,	0·072	,,	,,	695,000
,, 442	,,	0·081	,,	,,	617,000
	Mean	0·063			794,000

The length of the tapes being 50 metres and section 6 mm. × 0·5 mm.

This apparent lengthening may be due to a molecular change, or to a gradual straightening out of numerous small bends in the tape, or to both. During the same period it was found that a 5-metre iced bar, No. B 17, had altered in length nearly 10 microns—1 in 500,000, though handled with the greatest care. One tape, No. 437, during the standardization was kept out of doors when not in use, thus being subjected to temperatures from −10° C. to +30°, without showing any appreciable change in length.

It is advisable to measure the coefficient of expansion of every invar tape when great accuracy of measurement is required. It is usually enough to measure a short portion from one end, but now the new 50-metre tank is installed at the National Physical Laboratory, the dilatation over the whole length can be measured. The following figures are of interest as showing the variations one may expect in coils of one rolling:—

Tape No.	Expansion per degree C. for 50 metres.	Probable error.	Coefficient of expansion per degree Centigrade.
	mm.		
437	0·0207	± 0·0009	0·00000041
438	0·0213	0·0008	0·00000043
439	0·0203	0·0006	0·00000041
440	0·0187	0·0006	0·00000037
442	0·0220	0·0009	0·00000044

For many further details regarding invar tapes Nos. 437–442, see Appendix No. 4 Report for 1907, Coast and Geodetic Survey, Washington.

In practice it has been found necessary to measure the coefficient of expansion of each large coil (500 to 1200 feet) as soon as it leaves the rolling mills; also after artificial ageing. The coefficient of expansion is measured with the piece of tape under tension of 10 kilos, because the tape is used at this tension. A series of measurements has been made at the National Physical Laboratory under tensions of 5, 10, and 15 kilos. The results were the same within 1 in 10,000,000, and the differences were probably due to the difficulties experienced in keeping the tension constant throughout the test.

In order to determine the most suitable diameter for reels upon which invar tapes should be wound, a number of measurements were made at the National

Physical Laboratory, from which it appeared that 15 inches was permissible, but that 10 inches was too small. The tapes used were $\frac{1}{4}$ inch wide by $\frac{1}{50}$ inch thick. A 50-metre invar tape of the same section was subjected to a hundred reelings and unreelings several different times without showing any change in length, though 1 in 1,000,000 would have been apparent.

A tension of 16 kilos has been found very suitable for 100-feet and 24-metre tapes, either when used on the flat or in catenary. I have also used the same tension for longer tapes, because it is a great convenience to have only one size weight at one's base. The invar wires used on the Continent are also standardized under 10 kilos tension. The Coast and Geodetic Survey have adopted 15-kilos tension for 50-metre tapes $\frac{1}{4}$ inch wide by $\frac{1}{50}$ inch thick used on the flat.

The following strength tests have been made at the National Physical Laboratory:—

No.	Elastic limit in kilos per square cm.	Yield load in kilos per square cm.	Maximum load.		Modulus of elasticity in kilos per square cm.
			Kilos.	Kilos per square cm.	
1	6600	7800	420	8740	1,520,000
2	5800	7000	383	8050	1,440,000
3	6200	7400	396	8270	1,445,000

Size of Specimens tested.

1st grade 12·62 mm. × 0·381 mm. = 0·0481 cm.
2nd ,, 12·50 ,, × 0·381 ,, = 0·0476 ,,
3rd ,, 12·57 ,, × 0·381 ,, = 0·0479 ,,

Percentage total extension on 406 mm. of all three grades was inappreciable. The coefficient of expansion of the tapes used for the above tests was, No. 1 0·0000003, and No. 2 0·0000004 per 1° C.; No. 3 has not been measured.

Similar tests on an invar tape 6 mm. wide by 0·5 mm. thick have been made at the Bureau of Standards at Washington, and show the yield point to be about 70 per cent. of the tensile strength; the latter is between 450 and 500 lbs. actual, or 100,000 lbs. per square inch. Loads up to 60 lbs. at least do not cause permanent set. On a 50-metre invar tape, 6 mm. by 0·5 mm. on the flat, under tension of 15 kilos, a change in tension of 25 grams produces an apparent change in length not greater than 0·04 mm. On a 10-metre 6 mm. invar tape standardized on the flat at 10 kilos tension, the length was reduced by $1{\cdot}0_8$ mm. at 5 kilos, and increased by $1{\cdot}0_2$ at 15 kilos.

Invar tapes are used in three ways—

(1) Suspended in the air without any intermediate support, lengths 100 feet and 24 metres.

(2) Suspended in the air with from one to five intermediate supports, lengths up to 100 metres.

(3) On the flat or supported at a large number of points.

The divisions at each end of invar tapes are selected in view of convenience in reading to one-tenth of a division by estimation. In the case of 24-metre ones, 0 to 100 mm. and 24 m. to 24·1 m. are divided in millimetres. 100-feet tapes have 0 to 1 foot and 100 to 101 feet divided in $\frac{1}{100}$ feet divisions. The latter

can be easily read to $\frac{1}{1000}$ foot by estimation. Subdivided tapes have been made, but they are costly.

On a long tape it is rarely the case that the temperature can be the same at different points along its length. The error in the case of invar tapes is not serious. A way is open, however, to avoid this altogether. Invar has a high electrical resistance temperature coefficient. I had hoped to show this evening a special form of Thompson double bridge designed for me by Dr. C. V. Drysdale. In the near future we shall be able to have tapes standardized at an electrical resistance to be stated instead of at a given temperature.

The following discussion took place :—

Colonel CLOSE : I am not sure whether the fact that invar does not expand very much and is almost invariable, does away with the necessity of finding what the temperature really is in air. We have not broached that point yet. Must we adopt some method like that described by Mr. Baugh, viz. using electrical resistance instead of temperature as the variable factor of the length ?

Sir DAVID GILL : You want to determine the temperature, of course, within a degree or two.

Colonel CLOSE : How near to truth do you think we could get the temperature of a tape in air ?

Sir DAVID GILL : It depends whether it is clouded sky or sunshine ; I cannot tell you exactly. I know that the facts of measurement show that the error is very small indeed, after allowing for the temperature obtained by whirling a thermometer, and that the results do agree very, very much better when the temperature corrections are applied than when they are not. We know these facts from experience.

Colonel CLOSE : I suppose that the net result is that we shall arrive at a very accurate method of measuring bases—superior to any of the older methods. I thought, when this becomes fully accepted, with all these refinements Sir David Gill has described, we might perhaps remeasure that old Lough Foyle base—measured in the year 1827–1828—and see what sort of differences we get. We shall not even then be quite sure whether the differences are due to the alteration of the standards, or an alteration in the Earth itself, or in the alteration of the methods, but it might be worth doing.

Major W. J. JOHNSTON : I think we have had a most interesting description of the new comparators, not only for comparing standards, but also for comparing tapes as described by Sir David Gill. I had a certain amount of experience at Breteuil in comparing the long standards, and I did not quite understand Sir David when he said that their long comparator only admitted of use with an actual 4-metre length, because we measured 10 feet.

Sir DAVID GILL : No, you can use the Breteuil geodetic 4-metre comparator for determining absolute temperature coefficients of 4-metre bars only. The manner in which the microscopes are mounted limits the use of the apparatus to bars of 4-metres length, because the microscopes are fixed at that distance apart. They generally rely for temperature coefficients on experiments with bars of the same material not more than 1 metre in length.

Major JOHNSTON : They had intermediate microscopes with the long geodetic standard, the one that is in the long room by itself with the electrical trolley, and we arranged the microscopes to take 10 feet.

Sir DAVID GILL : Yes, that can be done, but not to determine absolute coefficients of thermal expansion of bars other than 4 metres long.

Major JOHNSTON: Another point I should like to ask is, Sir David spoke of using water in the boxes—I take it in the comparator boxes? I remember perfectly well when we asked M. Benoit to get an absolute determination for an old 10-feet Ordnance Survey bar he said he had not got the means, because he was afraid to use water with an iron bar. I take it you only mean your comparator to be applicable mainly for invar, or some non-corrodible metal.

Sir DAVID GILL: If you use an iron bar you invariably have gold or some such material to mark the terminal point, and I do not see that your bar would be any the worse for immersion in water, if that immersion is not for a long time.*

Major JOHNSTON: Is not there a chance of slight corrosion of the gold marks?

Sir DAVID GILL: No, not in the least.

Major JOHNSTON: I all along thought M. Benoit was making a mountain out of a mole-hill on the subject.

Sir DAVID GILL: The fact is he does not like to undertake work for which his apparatus is not suited.

Major JOHNSTON: Another point I should like to ask. In the comparator you have for the 4-metre comparator and for the 24-metre comparator, are the microscopes all carefully levelled by rosin? You did not quite clearly explain whether you levelled the bar up to the microscopes by keeping the bar level and altered the distance of the microscopes from the bar. In the work I did at Southampton in connection with a long standard we always levelled our microscopes by means of water through a tube; we dropped fine rosin on the water, and then focussed all the microscopes on the rosin scrapings, thus levelling the focal points of the microscopes practically to the plane of the Earth's surface throughout the whole length of the comparator.

Sir DAVID GILL: The microscopes of the Indian comparator have got every means of doing either the one or the other. As a matter of fact, we will level our bars to our microscopes, having previously adjusted the foci of our microscopes to a line in a truly horizontal plane.

Major JOHNSTON: I think there is no doubt that as far as work in the field goes, with the refinement of that pulley, the adjustable height will be of the greatest convenience. We found that in measuring the base in Scotland, one of the main features of delay was shifting of the tripod legs bodily into adjustment. Another great point, and one which to be sure Sir David Gill has not shown us in the base-measuring apparatus, are the tripods which carry the marks; but whatever apparatus is used in the field the marks on the tripods bearing the forward marks should have a large amount of play.

Sir DAVID GILL: The Guillaume tripods bear marks which have considerable adjustment.

Major JOHNSTON: That is the thing which takes all the time. I think that base measuring would go very rapidly indeed if one could have a large amount of play on the tripods. As regards Mr. Baugh's remarks, he gave us a very able discourse on the qualities of invar and relative to what has actually been done with invar; he referred very rightly to what has been done in America. He mentioned that the tapes used there are 6 millimetres in width. That is a very broad tape. Is that better than 3 millimetres? The narrower tape is the width with which we measured the base in Scotland. The American method of using a number of supports seems to me a clumsy one. You are not

* The use of some caustic soda in the bath will entirely prevent rust.—D. G.

taking advantage of what you get by having this magnificent apparatus for rapidity.

Sir DAVID GILL: I incline certainly to our simpler method of suspension.

Mr. BAUGH: I am entirely in favour of suspending the tape, but they prefer their method because they are accustomed to it.

Major WHITLOCK: Major Johnston has said all I had to say. I think the adjustments for raising, lowering, and aligning the tape to the marks, as described by Sir David Gill, are really what are wanted. It is a most difficult thing to get those tripods adjusted by straddling the legs. If you get a very rocky surface you hardly get them adjusted at all, except by mere brute force.

Major G. E. SMITH: I should like to ask what is the advantage of the tapes over the wire, because my experience was that the wire, when there was a certain amount of breeze, showed absolutely no movement; it took a considerable amount of breeze to move the wires, and I have always understood that the tapes were disturbed by a certain amount of breeze.

Sir DAVID GILL: Naturally, in wind the wire is preferable to the tapes. The first effect of wind is that it moves the plane of the catenary, and naturally that plane instead of being vertical is displaced; naturally when the wind is great it increases the sag of the catenary. Wind has much less effect on wires. There is no doubt about it that the wire is the better form in the wind. But the tape is so much less liable to kinks and undetected twists. Did you use the tape or the wire?

Major JOHNSTON: We had a tape, one-eighth of an inch wide, and there was only one day that we had to give up measuring, and then we were getting differences in a length of half an inch, the wind was so great. All you can do then is to stop work.

Sir DAVID GILL: Long before that, I should say!

Colonel CLOSE: Do you think these new bases are very much better than the old ones as regards accuracy? Take this Lough Foyle one.

Sir DAVID GILL: Yes, I should certainly say thay are better than the Lough Foyle one, but I do not suppose they are superior to the base measured in Spain.

Colonel CLOSE: Are they better than your bases I measured in South Africa?

Sir DAVID GILL: Our steel bar bases in South Africa were very accurate indeed, but the great drawback to that apparatus was we could only measure 700 feet forward and backward in a day, and consequently never measured more than 2 miles of a base, and then extended that base with very careful triangulation, employing a micrometrically centred theodolite, observing to small illuminated holes at night, and all sorts of very laborious business. Now with invar wires one never thinks of measuring less than 10 miles for a base. You get up and down hill and save all the loss of accuracy in extension of bases. It would be very interesting and useful to remeasure the Lough Foyle base, and it would be well worth doing. The great secret is to measure all your bases at once. If you have a party in full training you can do 4 or 5 miles a day comfortably, the most troublesome part of the work is the training of the party.

MAJOR GORDON LAING, AND THE CIRCUMSTANCES ATTENDING HIS DEATH.

From the Narrative of M. Bonnel de Mézières.

We alluded last year (*Journal*, vol. 37, p. 316) to the discovery of the grave of the Scottish explorer, Major A. Gordon Laing, who was murdered near Timbuktu in 1826. We have since received from M. de Mézières a narrative of the circumstances under which the discovery was made, preceded by a sketch of Laing's career and of his last fatal journey, from which the following brief account is extracted.

Laing, it may be recalled, was born at Edinburgh in 1794, a scion, on the mother's side, of the Scottish family of Gordon. After serving at Waterloo, he set out in 1820 for Sierra Leone, where he acquitted himself with success in a mission into the then unknown interior undertaken on behalf of the governor, with a view to checking the slave-dealing of the chiefs. The Ashanti campaign, which soon afterwards broke out, claimed his services and left him in impaired health; but no sooner was this re-established than he set out once more for Africa with the sanction of the British Government, this time purposing to reach the Sudan from Tripoli. He left this town for the interior on July 17, 1825, having only a few weeks before become united in marriage to Miss Emma Warrington, daughter of the British Consul. The journey, for the details of which we have to depend almost solely on the letters sent home by him during the march, went fairly well, in spite of delays and the excessive heat, until first Ghadames and afterwards Insalah had been passed, but Laing was then treacherously attacked by Tuareg, who pillaged his caravan and left him for dead, wounded in twenty-four places. Cured as by a miracle in the camp by the Kunta chief, Sidi Mohammed, he suffered a second misfortune through an epidemic of infectious fever, which tried him severely and proved fatal to his two European attendants. Undaunted, he resumed his perilous advance, almost without resources, and on April 18, 1826, thirteen months after leaving Tripoli, he sighted the buildings of the mysterious city of Timbuktu, which no European had reached before him.

During his stay, in a house which is still standing, and of which we here reproduce a photograph taken by M. Fortier, he occupied himself with a survey of the city and in collecting information from the inhabitants, among whom he established a reputation of which the memory is kept alive to this day. Dissuaded from taking the route down the Niger, he thought to reach the coast by way of the upper river, but these plans were frustrated by the state of affairs in that quarter, where the Fulas of Massina (the so-called Tukulors), under their Sultan Ahmed ben Mohamed Labbo, were then extending their sway. At the demand of this truculent chief, Laing was required to leave Timbuktu, and he set out for Arauan, but was treacherously attacked and murdered at a spot some 30 miles from

Timbuktu, the exact position of which has been hitherto unknown, as have also the exact circumstances of the murder, which was perpetrated by a Berabish chief, Ahmed or Ahmadu Labeida.

The opportunity for renewed inquiry arose through the flight to Morocco, after defying the French authorities, of the late chief of the Berabish, Mehemet uld Mehemed, grandson of Ahmadu Labeida, an old man who exercised a harsh authority in the Timbuktu region. M. de Mézières was charged by the French governor with such an inquiry, and he reached Timbuktu fortified with letters of recommendation from the religious associations of the Senussi and Tijania. Able to converse with the chiefs in Arabic, and assuring them of immunity from punishment, he soon obtained information on the facts of the murder, which are still well remem-

THE HOUSE IN TIMBUKTU WHERE THE LATE MAJOR ALEXANDER GORDON LAING STAYED BEFORE HIS MURDER ON OCTOBER 3, 1826.

bered in the country. In particular he obtained news of a *tarikh* or chronicle, preserved at Arauan, in which the events of each day are written down. Here he found the murder of Laing duly narrated, and was able to obtain a copy of the passage in question. It stated that the murder was committed at a spot called Sahab, beneath a tree known as *Athile*, on the 21st day of the month Safar, 1242 (*i.e.* A.D. 1826). M. de Mézières found an old Berabish of 82, named Mohamed-uld Moktar, nephew of Ahmadu Labeida, by whom he was conducted to the place, in company with Sheikh Aruaka, who had already been helpful in the matter. Sahab lies on the road to Arauan, 30 miles north-west of Timbuktu, and forms a large depression in which, the sand being mingled with clay, some moisture

remains after the winter season. Digging beneath the tree, the traveller came upon fragments of human bones, and at a little distance traces of a fire with remains of boxes, etc. These were carefully collected and taken to Timbuktu, where the bones were pronounced by Surgeon-Major Lefevre to be those of two individuals, an adult bearing the characters of a European, and a youth. This harmonized with the native statement that, of Laing's two servants, one had been wounded and taken to Timbuktu, while the other shared the fate of his master. The remains were carefully separated and placed in coffins.

The following is a slightly abridged translation of the extract from the *Tarikh* supplied to M. de Mézières :— *

"In the year 1242 Othman ben El-Kaid Bubakar came into power as Emir and Kaid. During this same year a Christian, of English nationality, coming from the east, arrived at Timbuktu. He entered the city, but could go no further into the Sudan by reason of the fear inspired by the Tukulors. It was, in fact, at the beginning of the successful religious expansion under Sheikh Ahmadu Labbo. This Christian stayed a certain time at Timbuktu, endeavouring to keep his presence secret, then he quitted the city and proceeded towards Arauan. At once mounting his horse at the head of a party of dependants, Ahmadu ben Labeida took the same route and joined the Christian at Sahab, a spot on the road to Arauan. The Christian having camped at Talhat-er-Rahhal, Ahmadu took up his quarters in the same place in order to watch him. The Christian having started again after a short halt, Ahmadu followed him, and having overtaken him at Sahab, killed him in the middle of the morning of Tuesday, the 21st of the month Safar, in the year above indicated. The murder took place near a small *Ethel* west of the *mejbed* (road), at a spot generally known as Gueblat-el-Meraier. Neither Ahmadu nor any of the notables with him appropriated any of the objects belonging to the Christian, nor did they even come near them. But the common people threw themselves upon the effects of the traveller, and broke open his two boxes. They found only 10 to 20 pieces of silver, and these one of them appropriated and concealed among his property, as was afterwards discovered. All that remained of the baggage was buried, after burning all the papers and other contents. In forbidding his companions to take possession of anything, Ahmadu acted under the persuasion that the whole was under a magic spell, of which they might be the victims. Another version has it that Ahmadu was merely the instrument of the masters of the country, the Ruma and Tuareg. This is more likely to be the true story, as Ahmadu was not powerful enough to put to death one in possession of the passport of those in authority."

The following is taken from a declaration made by Mohamed-uld Moktar, above mentioned :—

"I was brought up by Ahmadu Labeida, and have often heard him give the following account: In the year 1242 the Englishman, being at Timbuktu, and wishing to go to Arauan, readily obtained permission, as his presence caused discontent among the people. Ahmed Labeida agreed to act as guide, and Laing

* The extracts appear to be given not quite literally, but to include also the comments of M. de Mézières' informant, or of an earlier copyist.

started for Arauan on the 21st of the moon Safar, stopping at a place called Sahab, under a large *athile* tree. The next day he was joined by Ahmadu, Mohamed Feraji, and two other Berabish. The Englishman, thinking himself in security, allowed them to approach, whereupon Feraji and the two others threw themselves upon him, and Ahmed Labeida struck him with his sword. It was the 21st day of the moon Safar (which then fell in October). They left him on the spot, but collected his property, and as they accused him of coming to the country to poison it, and were suspicious of all that he had, they made a hole, kindled a fire, and threw in all his effects, stopping their noses as they did so. They only kept the money and jewels, among which was a little golden bird with outspread wings, which afterwards fell to Uld Mehemeh, grandson of Ahmed Labeida. Shortly afterwards a Berabish passed by, and seeing some human remains being eaten by birds, he buried them. Long afterwards he declared that he thought them to be the remains of a Musulman, and that if he had known the truth he would have left them as they were. A few years ago, when returning from Timbuktu in company with Feraji and Himid, son of Labeida, I asked the former to take me by the *athile* tree. We were in a valley between Timbuktu and Awssei. He pointed out a large tree at no great distance, and we went to it. . . ."

M. de Mézières declares that all the persons from whom he obtained the information entirely agreed in their statements. There seems, therefore, full reason for believing the above account to be correct.

Since the above was in the printer's hands, we have received from Captain C. Braithwaite Wallis, H.M. Consul-General for French Western Africa, an article on M. de Mézières' discovery, based on the documents submitted to him by the French authorities on behalf of that traveller. The two narratives naturally agree in all essential particulars, though some few details are given by Captain Wallis which supplement the narrative sent to us by M. de Mézières. Thus reference is made to two distinct *tarikhs* containing the record of the murder, and more precise statements are made as to the exact positions of the various remains dug up. These included additional bones found at a little distance from the first, but no conclusion seems to have been arrived at as to their identity. The papers sent to Captain Wallis were forwarded by him to the British Foreign Office, and he was subsequently commissioned to convey to M. de Mézières and the French authorities the thanks of His Majesty's Government for the interest and trouble taken by them in bringing to light new facts respecting the tragic death of the intrepid explorer. Captain Wallis also forwarded various photographs of localities in Timbuktu, taken by M. Fortier of Dakar—among them that of Laing's house reproduced above.

REVIEWS.

EUROPE.

A Text-Book on Ireland.

'A Geography of Ireland.' By O. J. R. Howarth. (The Oxford Geographies. Oxford: Clarendon Press. 1911.)

An island, as Mr. Howarth remarks, "is the most convenient unit for detailed geographical study." Hence his work on Ireland may serve as a typical statement of physical conditions and their relation to human enterprise, in an area not too large for comprehensive treatment. The position of Ireland, however, on the European continental shelf is rightly insisted on as an important influence in her history, and the continuity of her structural lines with those of Europe might, perhaps, have been more fully pointed out.

The features resulting from glaciation are appropriately set forth in an early chapter, since in so many areas they have controlled the surface forms. We miss here a reference to the Firth of Clyde as guiding Scottish ice towards the Irish coast, and to the "drumlins," a name that has spread from Ireland during fifty years throughout the world. On p. 19, moreover, fjords are ascribed only to glacial excavation, while the typical western example, Killary harbour, is said to be due to subsidence on p. 54. In geological matters the author has not always used quite the most recent data, and we do not like the description of the Mourne mountains, after some excellent details have been given, as having "the typical outline of a denuded volcanic highland."

The author (p. 86) adopts the view that members of the present Irish fauna and flora survived the Glacial epoch, and in this he will give satisfaction to many naturalists. The necessarily brief descriptions of the great plain, the western lakes running up into the metamorphic highlands, and the Galty mountains, to mention only three examples, show touches due to personal observation. A local teacher will be able to enlarge on many of the features mentioned, and the photographic illustrations that accompany the earlier section, dealing with the general structure of the country, present admirable scenic contrasts. The chapters entitled "Historical Geography" contain more history than geography. One would like to realize more crisply the entry of the Norse invaders, storm-tossed down the Scottish coasts, into the welcome and sheltering Irish inlets; the foundation of great cities, which lasted till the Normans claimed them; and the division of Leinster between the hillmen and the settled people on the drift-covered plain that stretches so invitingly from Dublin. The geographical causes of the bitter days of 1798, or of the flow of population to America, pass unmentioned. But these are probably for larger treatises. Mr. Howarth has clearly made us think; and that is one of the chief ends of such a well-written introduction as he has given us.

G. A. J. C.

The Tree Line in the Alps.

'Waldgrenzstudien in den Oesterreichischen Alpen.' Von Dr. Richard Marek. Gotha: Justus Perthes. 1910. 8.40 *m.*

The author has undertaken the task of determining for the Austrian Alps the height to which the forest ascends. In order not to be misled by purely local details and conditions he has used as his material not so much personal observations as already published maps and literature. In the introduction papers of merely historical interest are enumerated, up to the more thorough

work of Kerner von Merilaun. The following table shows some of Kerner's results compared with the author's:—

District.	Upper limit of trees (Kerner).	Limit of forest (Marek).	Difference.
	metres.	metres.	metres.
Central Alps (Ortler)	2307	2192	115
Central Alps (Oetztal)	2212	2087	125
Central Alps (Eastern Tirol, Salzburg)	1991	1910	81
Northern Tirolese Limestone Alps ...	1904	1897	7
South Tirolese Alps	2086	1936	150
North-eastern Limestone Alps ...	1674	1622	52
South-eastern Limestone Alps ...	1833	1793	40
	Average		82

The worked-out average difference of 82 metres between the upper limits of tree growth and of forest corresponds very closely with the actual differences observed in specific cases. The temperature is an important factor in determining the altitude to which the forest ascends. As you enter the chief mountainous regions where the average height of the whole mountain range rises markedly we get a rise of the isothermal lines, and also a rise of the height to which the forest ascends. But isotherm and isohyle do not rise along quite parallel lines. In the eastern Alps, for example, the isohyle rises from 1511 to 2029 metres, *i.e.* 518 metres, whereas the isotherm of 8·26° C. (taken during the vegetative period) rises from 1741 to 1890 metres only, *i.e.* 149 metres. Other factors must therefore come into play.

Heavy and frequent rains cause a depression of the upper forest limit. This may be due to the resulting cloudy and therefore more sunless condition of the sky. Snow again naturally limits the extent of vegetation so long as it covers the ground. Both snow and rain are more abundant on the exposed outer slopes of the hills than on the sides of the enclosed valleys. The wind also causes a lowering of the upper forest limit, especially again on the outer more exposed slopes. The upper limit of the forest is therefore shown to depend on the factors of temperature, rain and snow, and wind. But this is looking at the problem from a very general point of view. There still remain to be worked out many details connected with the condition of the soil, for example, and other purely local conditions.

O. V. D.

'Cambridge County Geographies': 'Ayrshire.' By J. Foster (Pp. ix., 175). 'Fifeshire.' By E. S. Valentine. (Pp. ix., 187.) (Cambridge: University Press. 1910. *Maps and Illustrations.* 1*s.* 6*d.* each volume.) These Scottish county geographies, which are under the general editorship of Mr. W. Murison, follow closely the approved lines of the English volumes. While there is no marked attempt to correlate physiographical and climatic conditions with those of human settlement and activities, these text-books provide much of the data for doing so. They also contain much of the information necessary to guide-books, in more than usually interesting form considering the limitation of space available.

'The Place-names of Berkshire.' By Rev. W. W. Skeat. (Oxford: Clarendon Press. 1911. Pp. 118. 2*s.*) In this small volume, which carries the weight of Dr. Skeat's well-known authority, the names explained are grouped for the most part under common suffixes. The places are, as a rule, roughly located by reference to some considerable town or village, or to a river. Those who

perpetuate the various inaccurate derivations of the name of the shire, or (to cite a case in which it is at least easier to err) identify Speen with the Roman Spinis, receive no mercy from the author.

'The Place-names of Berkshire.' By F. M. Stenton. (Reading: University College. 1911. Pp. viii., 56. 2*s.* 6*d.*) This interesting essay is one of those "issued in accordance with a scheme for the publication of studies dealing with particular aspects of local history," by the University College, where a fund has been established for the purpose. This essay brings out the physical contrast, and, in particular, the distinction between rough woodland and fertile parkland which is found to have existed as between East and West Berkshire, and is illustrated, *inter alia*, by the peculiar distribution of place-names of pre-Conquest origin. Dividing early place-names broadly as those having a descriptive and a personal origin, the writer analyzes each class, and illustrates it with many examples from his shire, and not a few parallels from elsewhere.

'Coventry' ('Mediæval Towns' Series). By Mary Dormer Harris. (London: Dent. 1911. Pp. xii., 356. *Map and Illustrations.* 4*s.* 6*d.*) There are few provincial towns possessed of a more interesting and fertile history than Coventry, once the fourth city in the kingdom, at present one of the most notable examples of the results of modern industrial development. It therefore finds an appropriate place in this well-known series, and its story is effectively told and illustrated. It is a town which bears less mark of antiquity upon its face than do most of those treated in the series; the value of this book is perhaps enhanced on that account, for such memorials of antiquity as remain are carefully indicated and described.

'Rambles around French Châteaux.' By Frances M. Gostling. (London: Mills & Boon. 1911. Pp. xiv., 372. *Map and Illustrations.*) This is a travel book of what may be called the intimate type, in the sense that the reader is addressed in the second person, and that the personal experiences and impressions of the writer make up a large proportion of the subject-matter. The authoress, who does not in this volume visit and write of France for the first time, on this occasion followed one of the customary routes for motor-cars, passing from Havre up the Seine and upper Loire, down the Rhone, across to Toulouse, and so northward into the "châteaux-country" proper, and thence to St. Malo. It is an intensely interesting route, as the writer very clearly shows so far as the description of places is concerned, though her appreciation of the varied types of scenery passed seems less marked.

'Rambles in the Black Forest.' By I. A. R. Wylie. (London: Mills & Boon. 1911. Pp. viii., 325. *Illustrations.* 6*s.*) This is on the whole a fair volume of its kind, full of pleasant narrative and pretty photographs. The second chapter, according to its title, "ventures to be mildly instructive," but it does something more, for the author, after dissociating himself from any attempt to "burden" the reader "with a heavy supply of geographical wisdom," describes the formation of the Black Forest in terms from which we cannot forbear to quote: "By a natural process the gases and burning lava lying beneath in the heart of the tableland cooled, bringing with them a contraction . . . which left immense cavities beneath the surface. On this frail crust lay the whole burden, which eventually proved too heavy. The crust yielded, the terrific masses thundered down into the depths, leaving behind solitary standing points which we now call mountains, and forming beneath valleys of very varying lengths and characters."

'The Bernese Oberland in Summer and Winter: A Guide.' By Julian Grande. (London: Nelson. 1911. Pp. viii., 201. *Maps.* 3*s.* 6*d.*) This seems an

excellent guide, in which particular attention is paid to mountaineers and to the interests of the growing number who visit the district for winter sports, while on the other hand the ordinary summer tourist will find all the information he needs. The maps, from the establishments of Kümmerly & Frey at Berne and Wagner of Zürich, are decidedly above the average. The historical matter is safe in the hands of the Rev. W. A. B. Coolidge.

ASIA.

Asia Minor.

'Meine Vorderasien Expedition, 1906 und 1907.' By Hugo Grothe and others. Vol. 1. Die Fachwissenschaftliche Ergebnisse. Leipzig: Hiersemann. 1911.

This is the first instalment of Dr. Hugo Grothe's report on the scientific expedition which was despatched in 1906, under Imperial auspices, to Asia Minor, Syria, Mesopotamia and West Persia. It was, we believe, not unconnected with the preliminary survey for the continuation of the Baghdad railway; and we can only say, as we have often said before, that we wish the British Government or those in our own high places would recognize equally the claims of science when such opportunities occur. The present volume is only to a very small extent geographical. The palæozoology of the Anti-Taurus and eastern Taurus, the archæology of the same regions and of southern and western Cappadocia, and the ethnology and sociology of the Yezidis of the Sinjar and Sheikh Adi districts, occupy nine-tenths of the text and all the plates; and geography proper is limited to a short study of Comana in Cappadocia by Dr. Grothe himself. But there is a good deal else which has indirect bearing on geographical problems, notably in the articles on *Kunsthistorik* by Prof. Josef Strzygowski and on the small finds (Hittite pottery, etc.) by Dr. L. Curtius. Dr. Grothe did a little excavation of tumuli near Zeresek and Albistan and found a number of new inscriptions, mainly Greek, elsewhere, besides some extremely interesting pottery. The succeeding volumes will be awaited with much interest by archæologists and students of ancient geography, as well as by geologists. D. G. H.

Mesopotamia.

'The Irrigation of Mesopotamia.' By Sir W. Willcocks, K.C.M.G., F.R.G.S. *With* 81 *Plans*. London: E. & F. N. Spon. 1911.

For the past three years Sir William Willcocks and his staff of surveyors have been engaged in studying the flood-plains of the Tigris and the Euphrates with a view to formulating a scheme by which this region may, at least in part, be restored to the fertility which it is said to have enjoyed in ancient times. In the present work he sets forth his proposals, which entail a total cost of some fifteen millions of Turkish pounds for irrigation works, and nearly fourteen millions for agricultural works. For this amount and a maintenance charge of £T.443,000 per annum, it is estimated that 1,410,000 hectares can be effectively reclaimed and irrigated. Naturally this report and the portfolio of plans which accompanies it are mainly concerned with the engineering questions involved, but much of geographical interest is contained in its pages. A fuller description of the great flood-plain of Mesopotamia and its characteristics would have been a valuable addition as forming a background against which the projected improvements might be pictured, but doubtless the author will supply this when addressing the Society on the irrigation of the Euphrates valley at no distant date. The tract of country which is concerned extends from Beled and Ramadi, where the Tigris and Euphrates respectively pass from

their valleys into the wide plain, through 600 kilometres of alluvial plain to the head of the Persian gulf, and is at its widest about 240 kilometres from side to side; its slope, too, is very low, since in the last 400 kilometres it falls only 18 metres. No triangulated survey of so large an area was practicable within the time available, so tacheometric traverses were run in conjunction with a plane-table survey, as well as level traverses by means of levels furnished with stadia wires. In such methods traverse errors of about 1 in 300 were incurred. Thus the plans are compiled from a large series of such traverses without being controlled by astronomically or trigonometrically fixed positions. A very large amount of levelling was carried out, which we may assume was of a good accuracy, being required for irrigation projects, though the accuracy demanded is not stated. The mean sea-level as determined from observations taken at the head of Khor Abdullah, about 25 kilometres south of Baera, on January 11 and 12, 1909, is used as the datum and the zero of the river gauge at Baghdad was found to be at 28·06 metres. From these observations cross sections and longitudinal sections have been drawn, showing the character of the great plain which is watered by the Tigris and Euphrates in their annual floods in April and May. Supplied as they are by the melting snows of the Armenian highlands, their floods come down into Mesopotamia early in the year, and are past before the heat of summer has fully set in, thus creating a different series of conditions to those which occur in Egypt, where the flood begins to decrease just before the autumn sowing. Five years' gauge readings at Baghdad show the Tigris to begin its rise in November, to reach a maximum in April, and to fall rapidly from the middle of May. Two years' observations of the Euphrates at Hitt show a similar *regimen* for this river. The range is about 4 metres for the latter and about 5 for the former river. The rising stage is characterized by rapid oscillations of level due to the comparative proximity of the mountain ranges, and as a result these flood waters carry a heavy load of suspended matter, which for the Tigris in flood was found on one occasion to amount to 7550 parts per million, or about four times that which is carried by the Nile in flood. Other measurements gave for the Tigris and Euphrates 1913 and 284 parts per million, but the dates are not stated. About seventy discharges of the two rivers and their branches were made from which a provisional table of discharges is calculated, which shows the Tigris to carry from 800 cubic metres per second in October to 3000 in April, and the Euphrates from 400 to 2750 in the same months. Taking this table, we obtain a total volume discharged in a year of 372,254 million cubic metres for the Tigris, and 346,594 million for the Euphrates. Thus this report marks a very important advance in our knowledge of the *regimen* of these rivers, and the true form and character of the alluvial plain which they and their tributaries have deposited. It is to be hoped that Sir William Willcocks will go further in this direction and supplement the information which he has collected in Mesopotamia by all that is available in the higher reaches of the river, furnish geographers with a full account of the hydrography of these rivers to which the present report is so important a contribution. The plans, upwards of eighty in number, have been excellently reproduced by the Survey Department of Egypt, but a caution should be given that many having been reduced to half or two-fifths of the original scale, their present scales as figured on them do not agree with those stated in the list of plans given in the report and in the portfolio. Fifteen appendices supplement the report by details of the meteorological observations, soil and water analyses, and reports on machinery, material, labour, etc., as well as details of estimates for the cost of works. H. G. L.

'Stalks in the Himalaya.' By E. P. Stebbing. (London: Lane. 1912. Pp. xxviii., 321. *Illustrations.* 12*s.* 6*d.*) A series of highly interesting sporting experiences. They are set out on scientific lines, as the author deals successively with the goral, stags, bears, and many other game animals of the Himalayas and Central Asia. He has much to tell of their habits, and an extremely appreciative eye for scenery. The book is illustrated by photographs and by lively pen-and-ink sketches of the various animals.

'India: its Administration and Progress.' By Sir J. Strachey. (London: Macmillan. 4th edit. Pp. xxiv., 557. *Map.* 10*s.*) But for three short chapters of a general introductory and geographical character, this book consists of a detailed survey of the methods of Indian administration. It is generally acknowledged to be within its compass the first authority on the subject, and being so, calls for frequent revision. This it has received, in the present edition, at the capable hands of Sir T. W. Holderness.

'Handbook for Travellers in India, Burma, and Ceylon.' (London: Murray. 1911. 8th edit. Pp. cxvi., 530. *Maps and Illustrations.* 20*s.*) This edition appears at an appropriate time, and has been amply revised under the editorship of Mr. H. C. Fanshawe, who had charge of two previous editions. The physical, climatic, economic and other maps and the numerous plans are excellent, and these also have been amended and received additions as necessary.

'The Old "Country Trade" of the East Indies.' By Comm. W. H. Coates. (London: Imray, Laurie. 1911. Pp. xiv., 205. *Map and Illustrations.* 3*s.* 6*d. net.*) The curious term which appears in the title of this book is of unknown origin, but has been long applied to Indian shipping trade within the Indian seas and as far as East Africa and China. This book contains an interesting record of it, from the earliest down to modern times. The shipbuilding industry is the subject of an illuminating chapter, and the student of trade routes, ancient and modern, will find useful material in the book. Some misprints call for correction.

'Village Folk-Tales of Ceylon.' By H. Parker. (London: Luzac. 1910. Vol. 1, pp. vii., 396. 12*s.*) The collection of these folk-tales, many curious and of interest as bearing close relationship to stories prevalent in far distant lands, affords opportunity for a valuable introduction on native life and customs.

'Sixty Years: Travel [Life] and Adventure in the Far East.' By J. D. Ross. (London: Hutchinson. 1911. Two vols.: xv., 354; xi., 411. *Map and Illustrations.* 24*s. net.*) This is a curious work, cast in the form of fiction, reading (at least in parts) like a book of adventure for boys, yet dealing with facts and real people, and with events of no distant past date. It deals, as the writer says, with "a society of which no description yet exists," and there is no denying its interest. The central figure in the narrative is an ex-captain, the scenes of whose venturesome career were set in the seas of China and the Malay archipelago. The title, as quoted above, indicates a variation between cover and title-page.

'The Story of Korea.' By J. H. Longford. (London: Fisher Unwin. 1911. Pp. vii., 400. *Maps and Illustrations.* 10*s.* 6*d.*) A somewhat scanty geographical survey introduces us to a history of the "Land of Morning Calm"—a history which singularly belies that picturesque name—from the earliest legendary times to the recent annexation by Japan. This event provided an obvious stopping-place for a written history and makes the appearance of one welcome, for the country has been a pivot, not only the home of politics of Far Eastern powers, but also of European relations with those powers for very many years, and the story was worth writing while its climax is still fresh in memory.

AMERICA.

North American Palæogeography.

'Outlines of Geologic History, with Especial Reference to North America.' A series of essays involving a Discussion of Geologic Correlation presented before Section E of the American Association for the Advancement of Science in Baltimore, December, 1908. Symposium organized by Bailey Willis; Compilation edited by Rollin D. Salisbury. Chicago: University Press (Cambridge: University Press). 1910. Pp. viii. + 306. 6*s. net.*

The volume of American geological literature is so vast that European geologists find it impossible to keep pace with it, especially owing to difficulties introduced by the frequent reduplication of place-names and the absence of many geologically significant localities from the usual atlases. This interesting series of essays on the geological history of North America will therefore be very useful to European geologists. The book consists of a number of papers on the correlation of American strata, collected by Mr. Bailey Willis, in connection with the meeting of the American Association for the Advancement of Science at Baltimore in 1908. The chief drawback in such compilations is the lack of uniformity in the treatment of successive systems, and this volume has no index and very few references. Several of the chapters had been already published in the *Journal of Geology*. Eight of them are illustrated by a series of most instructive maps, prepared by Mr. Willis, showing North America at successive periods of its geological history. They would have been even more useful if the names of a few of the less known but geologically important localities had been inserted. Inconsistencies between the views advocated in different chapters are striking, but are useful as indicating the unsolved problems.

The first two essays are on the classification of the Pre-Cambrian rocks by Principal van Hise and Prof. Adams; they direct attention to the differences in the standard classifications adopted in the United States and in Canada. This is followed by a chapter by Dr. Walcott, showing the high specialization of the lower Cambrian faunas, and insisting that Beltina, practically the oldest known fossil, was a more highly organized animal than a trilobite.

From the geographical standpoint, the most interesting part of the work is its contributions to the evolution of North America. Dr. Walcott shows that the North American continent in Lower Cambrian times had somewhat its present form; the coastlands on either side were washed by Lower Cambrian seas which apparently did not reach any part of the interior. In later times, however, the sea covered most of North America, the land being reduced to a few islands on the sites of Labrador, Appalachia and the Rocky mountains. Whether the adjacent oceans underwent equally radical changes is less clear.

According to Mr. Bailey Willis' palæographic maps, the oceanic basins of the North Pacific and Atlantic and even the deep basin in the Gulf of Mexico have endured throughout geological time. The one criticism to which these maps seem open is that, although they recognize the extreme changes that have happened in the distribution of land and water on the sites of the continents, they represent the oceans as having had a uniform and monotonous history.

Prof. Chamberlin, in the interesting final chapter "Diastrophism as Basis of Correlation," also accepts the permanence of the oceans and continents, and he adopts this view as a necessary consequence of their different specific gravities. In obedience to his extreme form of isostacy he states that "I am able to find no trace of lost continents." He is apparently only willing to accept former intercontinental connections by land bridges. Other chapters, on the contrary, give striking evidence from the distribution of animals and plants for the

necessity of fundamental changes in the distribution of land and sea. The palæontologists do not agree in details. Thus Mr. White believes from the evidence of fossil plants in the complete freedom of intercourse between Europe and the Appalachian region, whereas Mr. Williston (p. 166) advocates the complete isolation of North America from sometime before the close of the Pennsylvanian (that is, the Upper Carboniferous) to well into the Trias.

Prof. H. F. Osborn calls attention to the striking evidences of the Cainozoic mammalia as to the repeated alternate establishment and severance of the land connection between Europe and America.

Prof. Chamberlin's main contention that diastropic changes may prove the ultimate basis of correlation is extremely probable; for though in a heaving earth the movements are not necessarily in the same sense in all parts at the same time, it is probable that certain periods were marked by a deepening of the ocean basins leading to a world-wide emergence of the land. Such a change would give a precise date for correlation free from many of the uncertainties of the biological method.

Throughout the volume are interesting suggestions as to the evolution of climate. The editor, Prof. Salisbury, discusses the glacial climates, but his arguments regarding the lowering of the sea during glacial times are founded on the assumption of the contemporaneity of the various ice-sheets, which American work renders doubtful. Among other climatic questions considered are the variations of Arctic climate, on which the evidence is still very contradictory. The absence of seasons in Carboniferous times is inferred from the fact that the wood grown then had no annual rings. The important influence of aridity on the evolution of plants is advocated by Prof. D. T. MacDougal, who prefaces his essay by a most suggestive statement as to the possibility of the development of "self-generating matter" from such materials as nitrates and carbides by the processes known as thermo-catalysis. J. W. G.

'The Mountain that was "God."' By J. H. Williams. (New York and London: Putnam's Sons. 1911. Pp. 140. *Map and Illustrations.* 6*s.*) This is a valuable guide-book to Mount Tacoma or Rainier and its neighbourhood. It is chiefly notable for a very fine series of photographic illustrations which have been got together from many sources. The physical characteristics and history of the mountain are studied in some detail; the discussion over the name of course finds a place for consideration, and a chapter on the flora is contributed by Professor J. B. Flett.

'The English People Overseas.' Vol. 3. 'British North America, 1763–1867.' By A. Wyatt Tilby. (London: Constable. 1911. Pp. vii., 441. 6*s.*) This is a vivid history of British military, exploring, colonizing, and governmental methods in North America. It is divided into three books, the numbering of which is carried on from preceding volumes. Book IX., entitled "The Split of Empire," deals with the constitutional struggle of the Imperial Civil War, beginning from 1763 and carrying the history to 1801. Book X. is concerned with the extension of exploration westward—the stories of the North-West Passages and of the Hudson's Bay Company, and the establishment of the overland routes to the West coast. Book XI. traces the "birth of the Canadian nation."

'Old Indian Trails.' By Mary T. S. Schäffer. (New York: Putnam's Sons. 1911. Pp. xiv., 364. *Map and Illustrations.*) This is a story of fascinating journeys in the region lying between Laggan and the Grand Trunk Pacific Railway in British Columbia. It appears that the party covered ground untrodden before save by Indians, as in the district of Lake Maligne. Though no scientific

investigation seems to have been made (except by the botanist of the party), the record forms a pleasant narrative full of the best holiday spirit.

'My First Summer in the Sierra.' By J. Muir. (London: Constable. 1911. Pp. viii., 354. *Illustrations.* 7*s.* 6*d.*) This is a well-illustrated diary of life and nature-study in the Yosemite and elsewhere in the Sierra. It is a book for those who know the country rather than for those that do not. This is because the author possesses an intimate knowledge and love of the mountains, to the exclusion of other interests, such as is not often set out in print; he had his work among them besides taking his pleasure among them. Some details of the diary tend towards triviality, though they lend a certain attractive air of personality to the book.

'The Grand Canyon of Arizona.' By G. W. James. (London: Fisher Unwin. 1911. Pp. xii., 265. *Map, Diagrams, and Illustrations.* 6*s.*) The rather florid appreciation of this most wonderful feature of the Earth's surface is somewhat discounted when, at the seventh page of it, we find that in the author's opinion "the wisest men who have ever seen it . . . know they cannot describe it, but they proceed to exhaust their vocabularies in talking about it." Apart from this the book forms a practical guide to visitors to El Tovar and elsewhere. A curious point is the singular ineffectiveness of some of the photographs of the canyon. Technically excellent as they are, they might almost as well represent mud-cracks.

'A Fisherman's Summer in Canada.' By F. G. Aflalo. (London: Witherby. 1911. Pp. xii., 147. *Illustrations.* 5*s.*) This book may disappoint brother fishermen; there is less of sport than of travel and general description in it. It is written with all the author's usual charm of manner, and is beautifully illustrated.

'Across South America.' By Hiram Bingham. (Boston: Houghton Mifflin Co. 1911. Pp. xvi., 405. *Maps and Illustrations.* $3·50.) This is "an account of a journey from Buenos Aires to Lima by way of Potosi," one of the great trade routes of the early days, as the writer points out. His interests lie especially in the direction of antiquarian remains, the exploration of which, as recorded in the December number of the *Journal*, he is prosecuting with marked success on his new expedition. He has very fine photographs of some of them, and displays deep scholarship in writing of them. His topographical descriptions are good, and he has a keen eye to the economic resources of the countries visited.

GENERAL.

Economic Geography.

'Einführung in die Wirtschaftsgeographie: Produktion, Verkehr und Handel der Erde, mit besonderer Berücksichtigung Deutschlands und der Deutschen Kolonien.' By Prof. E. Friedrich. Leipzig: List & von Bressensdorf. 2. Auflage. 1911. 2*m.*

This volume of 178 pages consists of a survey of the economic plants and animals, minerals, and trade of the world, based upon the division of the climate-types of the world into four main sections with usually four sub-sections, which is illustrated by a rainfall map copied from Supan's Physical Atlas. After an introductory discussion of nature in relation to man, and a chapter devoted to the economic results of the collector's work, in regard to plants, animals, and fish, in which such products as rubber, timber, and furs receive treatment, the author proceeds to the cultivated plants and animals, to mining, industry, and trade both by land and water. Everywhere emphasis is laid upon the climate-

type, bibliographical references are numerous, and statistics are quoted. The later chapters on mining and trade are not so comprehensive as the earlier ones on agriculture, and the author, while he quotes percentage values in his statistical matter, does not appear to have discovered that most of the numerical facts which he gives are proportionally constant within a small margin of error. For example, in regard to oats production he specifically refers to the years 1909 and 1910, and states that the production in Europe is 56 per cent., in North America 29 per cent., etc., when it is possible to say that the Russian Empire produces a quarter, the United States one-fifth, Western Europe (Germany, France, Belgium, Holland, and Denmark) one-quarter, and the British Empire one-eighth—which includes Canada one-fourteenth, and the United Kingdom one-twentieth—of the world's oats. In the section on mining, references to tin, manganese, and mica appear to be lacking.

B. C. W.

EDUCATIONAL BOOKS.

'A Text-book of Geography.' By G. Cecil Fry. (London: University Tutorial Press. 2nd edit. 1911. Pp. xxi., 465. *Maps.* 4*s.* 6*d.*) The author is to be congratulated upon the demand for a second edition of this work. It has given the opportunity for a certain amount of expansion, though a book of this title, covering the whole field of mathematical, physical, and regional geography, must always suffer from severe condensation. It would be interesting (if it were possible) to investigate the question whether the impression of important facts or names by means of a sprinkling of heavy type provides the *memoria technica* which is so often attempted. To this edition some thirty new maps and diagrams have been added. They include fifteen coloured maps, which had been better omitted or executed (as they might have been) in black and white. In design, and especially in colouring, they are of the crudest description, and most of those in the copy before us have suffered disaster in the printing press.

'The Scholar's Geographical Exercise Book.' (Edinburgh: W. & A. K. Johnston. Pp. 46. *N.d.* 4*d.*) This useful book contains outline maps of the world (Mercator and Mollweide projections), the continents, and the principal divisions of them, of a convenient size for working exercises in distribution, etc. Every outline is given at least in duplicate. Several pages of squared paper for plotting curves are bound in the book, and the squares, as well as the outlines or the maps, are wisely printed in blue. No less wisely, the natural scale is given on most of the maps.

O. J. R. H.

'Geographical Diagrams and Land Forms: The British Isles.' By H. J. Snape, M.A. (London and Edinburgh: A. & C. Black. 1911. 1*s.* 6*d.*) This collection of diagrams, pictures, and statistics contains in small space much useful material for class-work: some of the diagrams might be a little clearer in detail; the pictures are carefully selected. The questions are suggestive and useful in showing how the author would apply the data he has collected.

'Progressive Course of Comparative Geography: Handbook and Key.' (London: G. Philip & Son. 1911. 5*s. net.*) This is a carefully prepared key to the text book bearing the same name. The author introduces and explains the scheme of the text-book, and makes general remarks on methods and equipment. The "answers" indicate, very naturally, the desired point of view, while it remains for the class-teacher to supply fuller details. Many suggestions are made with regard to books for reference and for collateral reading. The key is published at the request of teachers using the Progressive Course.

'Blackie's Causal Geographies: Europe.' By H. J. Snape, M.A. (London and Edinburgh: Blackie & Son. 1911. 2*s.*) The text contains forty pages of general analysis of the continental features, and seventy pages to the British Isles and to the countries of the mainland respectively. It is carefully written and the diagrams are clear. The maps are in some cases of doubtful value, and the book is prefaced with a map showing the continental divisions of *Asia*. Diagrams showing mean annual rainfall are not of superlative importance. The work is the first of a series of three volumes dealing with the world.

'The Oxford Geographies—Australia: physiographic and economic.' By Griffith Taylor. (Oxford: Clarendon Press. 1911. 3*s.* 6*d.*) This book is to be recommended to teachers requiring a clear and concise account of the continent's condition. Care is taken to weigh and examine considerations with which the author is not entirely in accord. One or two small points will require attention in a second edition, *e.g.* not every one knows the precise meaning of the term "dago," and too much stress should not be laid on *annual* isotherms. It does not, however, detract from an excellent text-book to venture to criticize what has been read with interest.

'General and Regional Geography for Students.' By J. F. Unstead and E. G. R. Taylor. (London: George Philip & Son. 1911. 6*s.*) This book is already in its second edition within a year of its first appearance. The authors have attempted to survey broadly the whole field of geography, and the title of the book points to its connection with examination syllabuses. The work, which is within the limits set very good, naturally is compressed in some parts into a very small compass. For instance, Central and Southern America have but seventeen pages, Africa twenty, Australia twenty. To compensate, however—the first part, dealing with World Geography, is very full, and with this part well mastered it is possible that the more sketchy portions of the book will be adequately supplemented by the students' grasp of principles. In any case, the authors, by their frequent references to larger works, evidently desire further reading on the part of the students. The treatment of natural regions deserves special mention.

'Guide to Geographical Text-books and Appliances.' Prepared by members of the Geographical Association. (London: G. Philip & Son. 1910. 5*s.*) This volume is a most useful compilation for the school library and for teachers' reference libraries. It deals with the complete equipment of a "geography" teacher, and the search has been wide and exhaustive and the comments are to the point. Such a publication should not be allowed to get out of date, and an index of the authors would be desirable, for it is very difficult to trace whether a book of the character of, say, Redway's 'New Basis of Geography' is included. The time and trouble taken in its compilation deserve general recognition from all teachers of the subject. Might one suggest that the Association should publish an additional list every three years, and carry out under the separate headings for each continent their scheme of reference to the "general" section of school text-books for all authors of whom mention is made? While dealing with the teaching of geography, it should be noted that a chapter by H. N. Stephenson, M.A., appears in "Broad Lines in Science Teaching" (London: Christophers), which contains sound views, and is worth attention. Particularly, if read in conjunction with the other chapters in the book, it places the subject in relation to other branches of school work having equal and predominant claims as school subjects.

'Physical Geography for Schools.' By Bernard Smith, M.A., F.G.S. (London and Edinburgh: A. & C. Black. 1910.) This is a useful book written for the use of students in the higher classes of our schools under limitations of cost,

Most of the illustrations deal with the British Isles. This feature is commendable. The author might have indicated more closely the type of school he had in mind. Much of the treatment is elementary in scope.

'Commercial Geography.' By E. V. Robinson. 1911. (Chicago and New York: Rand McNally & Co.) This volume, by the Professor of Economics in the University of Minnesota, is mainly devoted to America and American expansion. For teachers in this country it has a place as a very full treatment of the commerce of the United States, and to one wishing to deal fully with the North American continent such a work would be invaluable as indicating an American point of view, and illustrating it with a wealth of diagrams and statistics. Some of the maps are a little confused through abundance of detail. F. G. A.

THE MONTHLY RECORD.

EUROPE.

Variations in the Apparent Level of the Mediterranean at Ischia.—Prof. G. Grablovitz has recently determined the mean level of the Mediterranean at Ischia by means of a long series of mareograph records, extending from 1890 to 1910 (*Boll. della Soc. Sismol. Ital.*, vol. 15, 1911, pp. 144–153). During the first five years there was no marked change of level, after due allowance was made for variations in barometric pressure. In 1895, however, there was a sudden rise of 12 millimetres, or nearly half an inch. Since that year, with one exception, there has been a constant variation of level, not always in one direction; but on the whole, from 1894 to 1910, there has been a rise of 72·7 millimetres, or nearly 3 inches. A similar, though much less marked, rise has been ascertained from the mareograph records at Genoa. As Prof. Grablovitz urges the importance of such records in geodynamical investigations, it is evident that he attributes the apparent rise in the mean level of the sea to the gradual subsidence of Ischia.

Russian Exploration in the Northern Urals.—The little-known northern extremity of the Ural range was, in 1909, the object of scientific exploration by an expedition led by the Russian geologist, O. O. Baklund, of which a condensed narrative is given in *Petermanns Mitteilungen* for October, 1911. Arrangements having been made in advance for the laying of depôts in the country to be traversed, the expedition left Obdorsk early in June with a large following of Ostiaks and their reindeer, which gave the caravan quite a patriarchal character. The west bank of the Ob was clothed with a low growth of alder and birch, while the higher slopes were overgrown with larch, which extended in small patches in the river-valleys up to the *tundra*. Four marches brought the party to the foothills of the Ural, at the exit of the Kharema from the mountains. A pass of 1650 feet led from this stream to the wider valley of the Kharov, and another from the latter's upper course to the wide basin of the upper Sob. Hence the view to the main water-parting in the west disclosed a snow-clad landscape, while eastwards dark slopes with but few streaks of snow prevailed. Not a sign of life was visible in either direction. When marching over the snow-fields, under a never-setting sun, the temperature of 59° Fahr. seemed unbearable. The water-parting between Europe and Asia is so slightly marked that the direction of the streams could only be determined by close inspection. On passing into the valley of the Kholing, the

southernmost branch of the Shchuchya, the travellers passed from winter to summer—into luxuriant alder woods and meadows gay with flowers. The Shchuchya was crossed at its exit from the lake-source, and in the valley below the last foliage trees were seen. Passing the Great Saur-keu, the last high summit of the crest of the Ural, where wild reindeer were seen for the last time, the expedition crossed the source-region of the Pyderata (which rises from two small lakes), and, descending gradually with table-topped hills in view, reached at last the mountain group of the Minissei—the holy ground of the inhabitants—which falls steeply to the northern *tundra*. The hope of obtaining a collection of objects of heathen culture was not realized, the natives resenting the intrusion of the strangers. After a five days' halt, a part of the expedition returned to St. Petersburg, while the remainder proceeded west to the Kara river. The *tundra* in this direction was enlivened by birds, and by the encampments of Suryans and Samoyedes with their herd of reindeer. The Kara was found to flow in part through narrow ravines, in part through a V-shaped valley, the former causing some trouble to negotiate. The return was made partly along the coast, partly across a *tundra* diversified by bare hills with lakes between, towards the Pyderata. The streams that crossed this *tundra* flowed between high steep banks, whereas the Pyderata traversed alluvial deposits. On the other hand, the narrow valley of the Shchuchya, clothed in green larch-woods, consists of diluvium. On September 19 the expedition was back at Obdorsk, having executed a survey based on seven astronomical positions, besides securing valuable results in the departments of zoology and botany. Proof was also obtained of the former more extensive glaciation of the northern Ural.

ASIA.

Indian Administrative Changes.—The great Durbar, held with signal success at Delhi early in December, was the occasion of the promulgation of a decision on the part of the Government of India which is of momentous import for the future of that country. It involves changes in the administrative machinery which must have far-reaching effects, betokening as they do a distinctly new development of policy. Only the main facts can here be touched upon, and the representation of the changes on a map must wait for fuller details. In the first place, the capital is transferred from Calcutta—a comparatively modern creation of European commercial enterprise—to Delhi, the ancient capital associated with so many of the great events under the native *régime* of the past. Apart from the reasons of a sentimental nature, it is held that advantage will accrue from the more central position of Delhi, and its nearness to Simla, to which climatic considerations necessitate the removal of the Government during the hot season. Its greater distance from the sea, as compared with Calcutta, places Delhi in a different, and, it is held, more favourable climatic region, continental rather than oceanic in character. It is marked by a lower relative humidity and by greater temperature contrasts; for while the summer temperature is higher, that of winter is decidedly lower than in Calcutta. On the other hand, a possible disadvantage consists in its distance from the sea, which removes the new capital from easy access to the ocean routes of commerce. It is, however, well provided with railway communication with all parts of the peninsula by means of the trunk lines which radiate from it in all directions.* The second change has to do

* In connection with the change of capital, Sir Clements Markham calls attention to an interesting paper read before the Society in 1867 by The Hon. (afterwards

with the reconstruction of the administration of Bengal and Assam. Whereas the rearrangement of 1905 met with opposition chiefly on the score of its division of the Bengali-speaking population between the two provinces then formed, the new decision will unite this once more under the territorial unit of Bengal, to be raised to the rank of a Presidency administered by a Governor-in-Council, while the western parts of the late province of Bengal—Behar, Chutia Nagpur, and Orissa—with a Hindi and Uriya-speaking population, become a distinct unit under a Lieutenant-Governor-in-Council, and Assam is relegated to the rank of a Chief Commissionership. Bengal—corresponding to the five existing divisions of The Presidency, Burdwan, Dacca, Rajshahi, and Chittagong—will have an area of about 70,000 square miles, with a population of some 42,000,000. The new province to the west, the designation of which does not appear to have been yet decided on, will be approximately 113,000 square miles in extent, with a population of about 35,000; while Assam will in future have its old extent of 56,000 square miles, with a population of only about 5,000,000. It does not yet appear certain whether the existing boundaries of districts will be rigidly adhered to where forming the boundaries between the new provinces, or whether any rectification will be introduced.

The Height of Teram Kangri.—The following communication on this subject from Colonel S. Burrard, R.E., to Dr. T. G. Longstaff has been forwarded to us by the latter for publication. It is dated Dehra Dun, November 19. "The final calculation of the height of Teram Kangri has not yet been made, but the preliminary calculation shows that the height of the peak is about 24,300 feet. This is considerably lower than the computing office of the Trigonometrical Survey had expected. I feel some responsibility towards you, because when you were unwilling to publish your original value of height I persuaded you to do so and urged you not to be afraid of being wrong. I still think that you were right to publish your result, because if every one waited till his results were proved, progress would be very slow. We have been looking into your observations and our only conclusion is that Teram Kangri must have been 3 or 4 miles nearer to you than you supposed. You made its distance too far, and thus its height came out too great. Of course your intersections of Teram Kangri did form a very acute angle, and so any error in either intersection would tend to make the distance of the peak incorrect. Our office, when advising you, was perhaps not cautious enough. We have had, too, enough experience of errors in height to make us cautious; the error in the original value of Nanga Parbat was over 6000 feet, more than double your error, and the errors in the original values of the peaks of Spiti were over 8000 feet. On the present occasion, our own observer, Mr. Collins, did at first get the height of Teram

---

Sir) George Campbell on "The Geography and Climate of India, in reference to the best Site for a Capital." Many of the considerations which have influenced the final decision were then touched upon, either in the paper or in the discussion which followed (see *Proceedings*, vol. 11, pp. 54–77). Among the more or less obligatory conditions for a new capital, the reader laid down "climate and nearness to the sea, and perhaps also the immediate proximity of a great public opinion." From a careful survey of the geography of the whole peninsula, he finally fixed upon Nassick, or some such point in the plain of the Upper Godaveri, as best meeting the requirements. In the discussion, one of the most important contributions came from Sir Charles Trevelyan, who, while fully concurring in the desirability of separating the site of the supreme from that of the local governments, thought the position suggested not central enough, and not sufficiently in touch with the public opinion of the whole of India. He therefore preferred a site on the high, healthy tableland of Central India.

Kangri within 1000 feet of your value, but that was when he was relying upon his plane-table intersections to give him the distance of the peak; when he calculated his triangles observed with a theodolite, he found that the peak was nearer. The extraordinary power that snow possesses of reflecting light renders the apparent distances of snow-peaks very deceptive; in sunlight they appear nearer than they are, and when they are under clouds they seem more distant than they are. You will, I know, be interested to hear about our observer's doings; he was a young fellow of twenty-five, Mr. V. Collins. He had never done mountain climbing before. Yet he climbed in one place to 21,000 feet, cutting his way with an axe above 19,000 feet. His highest station of observation from which he took theodolite observations was Skaupuk, height 20,300 feet. When he got to the top he found himself in a snowstorm and unable to see anything. This snowstorm went on for some days, and six days passed before Collins could observe Teram Kangri. For six days he stuck it out in a small bivouac tent at 20,000 feet; not bad for a beginner. His observations have been overhauled; he observed Teram Kangri from four different stations, and the result must be nearly correct. Mr. Eccles will send you final figures as soon as he can." Dr. Longstaff adds that the figures since received give a value of 24,489 feet, which can be relied on to within 100 feet.

Prof. Machaček's Researches in the Western Tian Shan.—During the summer of 1911 an expedition for scientific research in the Tashkent region was carried out by Prof. Machaček, whose preliminary accounts of the journey have appeared in the *Mitteilungen* of the Vienna Geographical Society, 1911, Nos. 7-9. Accompanied by Herr J. Walther of Tashkent, whose knowledge of the native languages proved of great service, Prof. Machaček set out on April 18 on his first trip, which took him, after passing through the thickly populated loess region round Tashkent, through the terrace landscape of the Chirchik to Khojakent, and thence along the border of the mountains to Khojent, where the Sir-daria makes its exit from the basin of Ferghana. While following the southern edge of the Chatkal range he was able to study the enormous masses of late Quaternary detritus which, quite recently dissected by valleys, have given rise to a remarkable "coast-plain" landscape at the foot of the mountains. The second trip led north by Chimkent to the point where the Karatau branches off from the first chain of the Talas Alatau, and on the return passed through the zone of Carboniferous limestone belonging to the latter range. On May 30 the traveller set out in a south-easterly direction, and seven times crossed the main crest of the Chaktal-tau which bounds the Ferghana basin on the north, by passes reaching an altitude of 12,500 feet. In particular he studied the well-preserved peneplain of the Angren plateau, which has hitherto escaped adequate attention, as well as the scanty traces of the effects of the Ice age. The last part of the expedition was devoted to the region of the Talas Alatau, which was crossed at various points and followed eastward to its junction with the chains of the Narym region. Here too glacial studies were undertaken, which showed a surprisingly slight depression of the snow-level during the Ice age. The morphological studies throw clear light on the evolution of the range from the Tertiary period of mountain-building.

Dr. Legendre's Explorations in Western China.—French exploration in Western China has found a zealous worker during the past few years in Dr. Legendre, some of whose journeys have already been alluded to in the *Journal*.*

* A recent report that Dr. Legendre and M. Dessirier had been murdered by the natives has fortunately proved incorrect, the two travellers having only been slightly wounded.

Like Captain D'Ollone, whose explorations along the Western Chinese borderlands have lately been described in his book 'Les derniers Barbares,' Dr. Legendre set himself to explore some of the many yet unknown patches in the mountains of northern Yunnan and western Sechuan, with their interesting primitive tribes. He left France on his latest journey in September, 1910, and had already, by April, 1911, completed several useful pieces of work, the results of which are described in letters printed in the October number of *La Géographie*. From Yunnan-fu he went north-west, accompanied by MM. Noiret and Dessirier, to Hetsin, crossing *en route* a series of mountain ranges running from north to south. He then explored the course of the Makai or Tsoling-ho, which flows through a succession of gorges to join the upper Yangtse at the south point of its great bend, and is a torrent useless as a waterway. Soon afterwards he examined the mass of mountains, still covered to a large extent by forests of oaks, pines, etc., and inhabited by Lissus, Lolos, and Miaotre, which lies south of the Yangtse and east of the main road north to Hweili-chou. The mean altitude of the chain is little less than 10,000 feet, the whole bearing the character of an eroded sandstone plateau, so common in Yunnan. The Yangtse was crossed at Luche, the river itself being here placid, though the valley walls are extraordinarily steep and high. This gorge is due, in part at least, to fracture of the strata. Having reached Ningyuan-fu, and being compelled to visit Chengtu, Dr. Legendre explored *en route* the course of the Puhyong-ho, a tributary of the Tong-ho, which, apart from former work of his own, had been hitherto unsurveyed. Subsequently, from Ning-yuan-fu as centre, excursions were made in different directions. M. Dessirier explored the important range lying between the valley of the Nganning on the west and that of the Puke, traversed by M. Bonin, on the east. It is exceedingly broken and difficult, covered with fine forests said to harbour many wild animals. While the Lolos, in small numbers, occupy the upper ground, the best positions in the valleys are held by the Chinese, though these have lost ground of late years, and vegetation has once more overrun much of the country. At the end of March Dr. Legendre and M. Noiret explored the porphyritic range which runs from north to south between the valleys of the Tung-ho and Yangtse separating the valley of the Nganning from the basin of Yuesi. It was crossed by a pass nearly 14,000 feet high, the upper parts being still snow-covered, though spring flowers were in blossom somewhat lower. Later news, given in the September number of *La Géographie*, is dated July 1, 1911. Dr. Legendre and M. Noiret had then completed the examination of the Yalong between 28° and 30° N., north of the point where the Comte de Polignac and Captain Audemard (*Journal*, vol. 37, p. 211) had turned back. To reach it they had crossed an exceedingly mountainous country covered with splendid forests.

Exploration of the Yamal Peninsula, Western Siberia.—One of the most important pieces of exploration lately carried out in Siberia is that of Mr. B. M. Shitkof, in the Samoyede peninsula between the Kara sea and the Gulf of Ob, the interior of which has hitherto been almost unknown, though the coasts were surveyed by Ivanof in 1827–28. The peninsula has usually been known as Yalmal, but this, according to Mr. Shitkof, is incorrect, the proper form being Yamal, which means "End of the World." * Mr. Shitkof's preliminary report has been made generally available by publication in *Petermanns Mitteilungen* for July and August of last year. It includes both a brief narrative of the

* This interpretation was given by Nordenskiöld in the 'Voyage of the *Vega*,' though he still used the form Yalmal.

journey and a summary of the principal results, and is accompanied by a map on the mean scale of 1 : 1,750,000. The expedition was equipped by the Imperial Russian Geographical Society early in 1908, and the leader was supported by a topographer and a natural history collector. With 12 men and 480 reindeer, a start was made from a rendezvous near Obdorsk at the end of March, and the outward route led over the interior tundra, somewhat to the east of the axis of the peninsula, first to the twin lakes Yaroto (in about 68° N.), which give rise to the two upper branches of the Yurubei, and afterwards to Lakes Noite and Yambuto, just north of 70°. The effluents of the latter two lakes are no doubt the Mutnaya and Selenaya of old maps, flowing respectively to the Kara sea and the Gulf of Ob. Mr. Shitkof continued his journey, still in the eastern half of the peninsula, to its northern extremity, and after various excursions crossed Malygin strait to White island, but was forced to turn back before reaching its northern shore. These journeys permitted observations of the state of the ice and the extent of open water along the coasts. An interesting find was the mound raised as a mark, in 1737, by Malygin and Skuratof, members of the Great Northern Expedition, and mentioned also by Ivanof. It lies close to the northern shore of the peninsula, and is likely soon to be undermined by the waves. The southward journey was made for some distance on or near the shore of the Kara sea, sometimes on the coast ice; but after passing with some difficulty the mouth of the Mordi—the large river which receives the effluent of Lake Noite—the explorer struck inland and rejoined his companions, the further march south being made in company some distance west of the outward route. Mr. Shitkof gives a useful summary of the general features of the peninsula, which shows nowhere any trace of primitive rock, but consists of slightly elevated tundras, broken by the depressions of the river-valleys and lakes. Of the latter there is a large number. The last woods of conifers were found in about 67° N., though isolated clumps occur beyond this parallel. Further north the only trees are dwarf willow and birch. Grass abounds in parts, and the tundra is in some parts gay with flowers. The fauna of the northern and central parts is typical of the tundras, including the polar bear and walrus (on the coasts), the wild reindeer, wolf, ice-fox, glutton, hares, etc. The climate is characterized by strong winds, and the snowstorms of spring are violent and long continued. The maxima and minima of temperature observed in May were − 21·6° and + 3·1° C. (−7° and + 37·6° Fahr.), while in June they rose to − 2° and + 25·5° (28·4° and 78° Fahr.) respectively. The ice on the lakes reached a thickness of 7 feet, while the snow-cover on the level tundra was generally less than a foot deep. The peninsula may be divided into three zones, a northern, central, and southern, differing in their general character and productions. The paper concludes with some interesting notes on the Samoyedes of the peninsula, who are generally well-to-do, owning large herds of reindeer, and have so far been little touched by the advance of civilization.

The Sea-route to the Kolyma.—We learn from *Petermanns Mitteilungen* (November, 1911) that a successful voyage from Vladivostok, through Bering strait to the Kolyma, was carried out last summer by Rear-Admiral Trajan, on behalf of the Ministry of Trade and Industry at St. Petersburg. A Norwegian steamer was chartered, and its name changed to the *Kolyma*, a crew of volunteers being got together and a start made in July. For the first part of the way the *Kolyma* was accompanied by two vessels belonging to the Marine Department, but on account of the difficulties of the ice-navigation they were forced to turn back before reaching their destination. Drawing only 15 feet, the *Kolyma* was able to avoid the ice by hugging the shore, and the voyage to

Nishne Kolymsk was accomplished within a month. The main object of the voyage was to open up trade in Russian goods with the north-east coast of Siberia, the needs of which have of late been supplied by American traders, making their headquarters at Cape Deshnef. A cargo of goods was taken by the *Kolyma*, and the problem of the establishment of the wished-for trade is regarded as solved. The enterprise will be repeated on a larger scale next summer. News has since come to hand that the voyage to Nijne Kolymsk was carried out independently, about the same time, by an American vessel.

AFRICA.

The Franco-German Treaty.—In the note on this treaty in the December number, it should have been mentioned that Germany agrees to lease to France, under conditions to be fixed by a special instrument, parcels of ground, each not more than 50 hectares in extent, along the Benue and Mayo Kebi and on towards the Logone. This is for the purpose of establishing a line of communication, with stations, to the Chad territory by way of the Benue. No similar right of establishing stations is, however, acquired by France in respect of the tongues of German territory crossing the route from the south, but she retains possession of the telegraph line along the Ubangi, where this passes through the ceded territory. Provision is also made for the possible construction by either Power of a railway across the territory of the other.

The Frontier of Walfish Bay.—The divergent claims of Great Britain and Germany in regard to the southern and south-eastern frontier of the Walfish bay territory were finally adjusted by the decision of the arbitrator, Don Joachin Fernandez Prida, given in May, 1911, but only lately published as a Parliamentary Paper (Cd. 5857). The whole history of the dispute and the arguments put forward by the two sides are reviewed at length by the arbitrator, who then gives his decision in two paragraphs. The first act of annexation on the part of Great Britain took place on May 12, 1878, when Captain Dyer, of H.M.S *Industry*, visited the place and took possession of the territory, assigning to it boundaries, which were, unfortunately, as has so often been the case, described in terms which admitted more than one interpretation. Thus the starting-point on the coast was to be a point "15 miles south of Pelican point," but it was not clearly stated whether statute or nautical miles were intended. From the coast the line was to run to Scheppmansdorp, whence the eastern frontier was to be drawn in a line "to the Rooibank (a mistake for Rooikop) *including the plateau*." The annexation of the territory to Cape Colony was proclaimed in August, 1884, simultaneously with the declaration by Germany of a protectorate over the adjacent region, and this was followed, in 1885, by a demarcation of the frontier by the Cape Government surveyor, Mr. Wrey, who marked the line in accordance with the interpretation of Captain Dyer's proclamation adopted on the British side. Thus *nautical* miles were considered as intended, while the phrase "the plateau" was taken to include the pasture-land in the bed of the river Kuisip, and not merely the portion of the Namib embraced by a straight line from Scheppmansdorp to Rooikop. This interpretation was disputed by Germany, who also objected to the demarcation by Mr. Wrey, as made after the annexation of the neighbouring German territory, by one interested party only. No agreement having been found possible, the matter was submitted to arbitration in 1909. The above-named arbitrator, appointed by the King of Spain to act on his behalf, is Professor of International law at Madrid University, and he not only examined all the evidence put before him, with a view to arriving at the

motives of the acts in question and the interpretation put upon them at the time, but studied the ground by personal inspection. The result is that Mr. Wrey's line is pronounced not necessarily binding on Germany, but it is adopted by the arbitrator as according with accomplished facts.

AMERICA.

Mud Volcano off Trinidad.—We have been favoured by Mr. E. C. Buck, A.M.I.C.E., with a copy of the *Port of Spain Gazette* of November 7, 1911, containing an account of the recent appearance of a volcanic island off the coast of Trinidad, based on his personal observations during a visit to the island, as well as on information collected from other sources. The first appearance of the latter was on the morning of November 4, the position being 3½ miles from Erin and 1½ from Chatham, in the southern part of Trinidad, in a direct line between Point Islote and Point Erin. It was at first unattended by any violent manifestation, and, when first seen, the island was merely a mudbank 50 feet across and 25 feet above the level of the sea. Observers near Erin report that while watching the newly formed bank on the evening of the same day they saw it suddenly burst into a tremendous blaze, which rose hundreds of feet into the air, and that as the flames subsided they were replaced by a dense volume of smoke which covered the whole atmosphere and changed into a beautiful deep sulphur colour, with a very penetrating pungent smell. This was so marked that residents in the neighbourhood feared suffocation. Loud detonations followed and were heard all along the coast, giving rise to all sorts of surmises. On the morning of November 5 a party, consisting of the Governor (Sir George R. Le Hunte), the Chief Justice, and other officials (Mr. Buck amongst them), started by steamer from Port of Spain to visit the newly formed island. At a distance this had the appearance of a black streak on the horizon, but on nearer approach the surface was seen to present a peculiar granulated and honeycombed appearance. The roughness of the sea made landing difficult, as did also the condition of the mud, which was still hot and in some places soft, with merely a thin crust on the top. The island, which was thoroughly explored, had a whale-back outline, and two craters were found on the summit near the northern extremity. One of these resembled the mouth of a well, being circular, about 6 feet in diameter, and 3 feet high; it constantly emitted mud, gas, and steam. The area of the island was about 2½ acres, but there was little doubt that the heavy seas would soon wash it away.

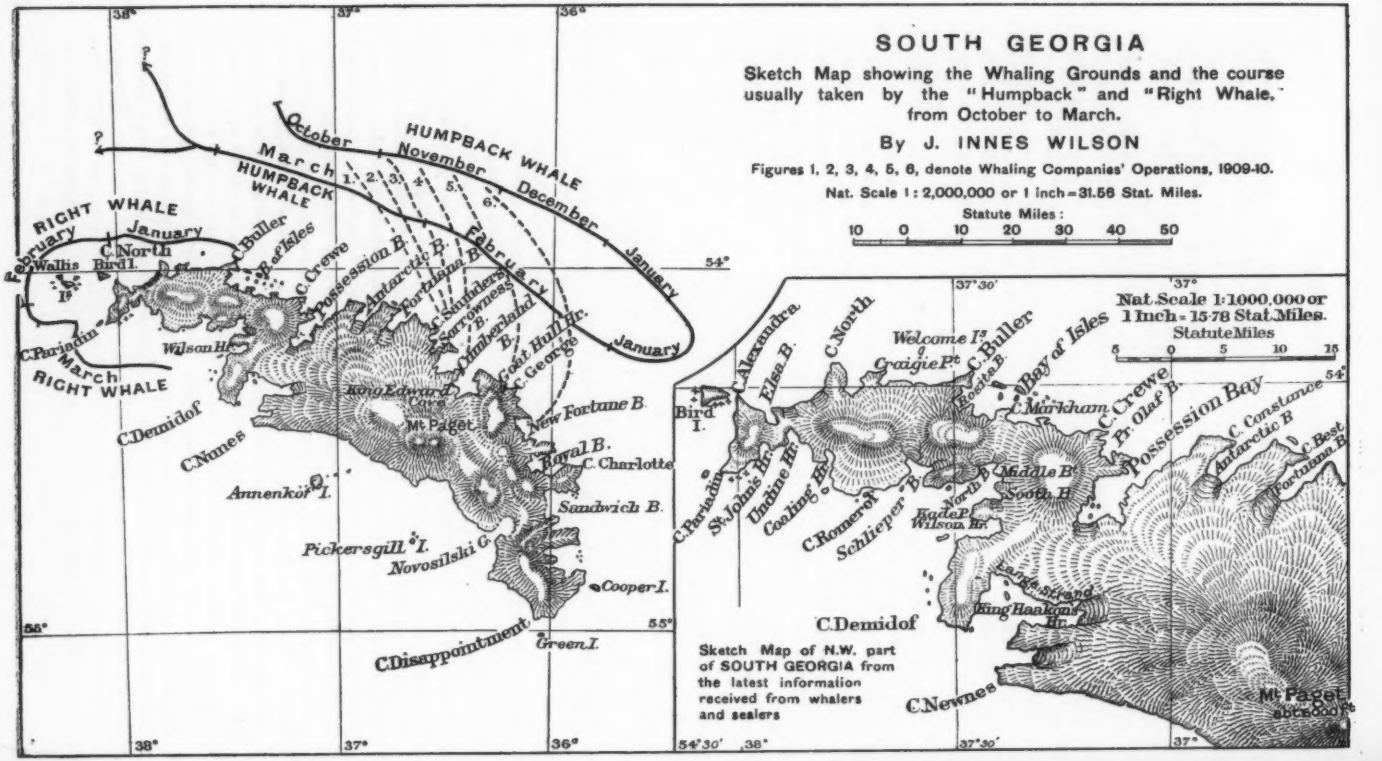
Official Time in the Argentine.—The Argentine Republic has now come into line with such other South American states as have already adopted an official time based on the Greenwich meridian, by a decision which came into force on December 1, 1911. From that date standard time will be exactly four hours later than Greenwich mean time, or one hour in advance of the time adopted by Chile and Peru.

Eighteenth-Century Exploration of Guiana.—Dr. Ijzerman, of the Netherlands Geographical Society, prints in the Society's *Tijdschrift* (vol. 28, 1911, No. 4), two documents relating to real or supposed journeys of exploration in the interior of Guiana which have hitherto escaped notice. They are attached to a map of the Corentyn river, preserved in the Dutch Government archives, and relate, the first to a journey from Paramaribo to the upper Rio Branco (the Parima associated with so many legends of El Dorado) carried out in 1718 by one Gerrit Jacobs, a Jewish trader; the second to a pretended exploration of the Corentyn in 1720 by a "mining director," Salomon H.

Sanders.* Both took place under the governorship of Johan Coutier. The first account, though brief, is circumstantial, and the details given permit the route to be followed on any good map of British Guiana, though the place-names are somewhat corrupted. Jacobs went partly by the coast, partly through the interior to the upper Essequibo, and his further route seems to have led by the Rupununi (the characteristic bend of which is referred to), Mount Makarapan, the Awaricuru, etc., to the Rio Branco, where, finding himself not far from the districts under Portuguese influence, the trader thought it wise to turn back. Sanders was sent up the Corentyn to obtain information on the reputed mineral wealth of the Parnassus mountains, and his report and map make it appear that he explored the river to its sources, and discovered rich deposits of the precious metals. But the samples brought back proved to be worthless, and subsequent events showed him as an impostor, his map having been derived to a large extent, it seems, from previously existing material. At any rate, his statement that he pushed on to 2° N. lat. in the source region of the Corentyn deserves little credence, though it is possible that he reached the mouth of the Lucie river, the course of which has only quite lately been explored (*Journal*, vol. 37, p. 665). He seems to have obtained information which led him to suppose (as is now proved to be the case) that this tributary afforded a practicable route to the upper Surinam, and he even urged the investigation of the relations of the two river-basins—an investigation which has only been carried out after the lapse of two centuries.

The Coast of South Georgia.—South Georgia, one of the dependencies of the Falkland Island colony, about 100 miles in length and 20 miles in greatest breadth, was discovered by Antony La Roche in 1675, and taken possession of by Captain Cook one hundred years later. It consists of a range of high, almost perpendicular mountains usually covered with ice and snow, and has been little visited or described until recently, when it has become better known owing to the development of the whaling industry round its shores, and the appointment of a magistrate by the Colonial Government. The following notes and the additions to the Admiralty Chart in the accompanying sketch-maps have been supplied by Mr. J. Innes Wilson, at present stipendiary magistrate on the island. Starting from Cape Nunes and travelling towards the north-west, the first harbour of any importance is the well-sheltered King Haakon's harbour, with high land all round and a big glacier at its head. Proceeding round Cape Demidof, we enter Wilson harbour, one of the best on this part of the coast. The land round its head is flat, with abundance of tussock grass. Next come the bays now known as South bay, Middle bay, and North bay, affording very little shelter to a ship, but frequented by large numbers of sea-elephants. Above Middle bay is a plateau of tussock land about a mile wide, running inland to a distance of nearly 2 miles. The next harbour of any importance is Undine harbour, which is said to be excellent both for sealing and whaling. Wallis island, off the north-west end of the mainland, is a very high island rising abruptly from the sea, and about 4 miles long. Tussock grass is scattered here and there along its coast, but the centre is quite bare. Bird island is a very fine piece of tussock land about 4 miles long, rising high out of the water at one end, but gradually inclining to a lower level at its opposite end. It takes its name from the number of birds found here: sooty and wandering albatros, "mollymawks," cormorants and shags, "pipit" larks, *Prion Banksi* (known in the Falklands as "fire birds"), "gentoo," "king," and probably

* The second name is given in one place as Herman, in another as Hendrik.


SOUTH GEORGIA
Sketch Map showing the Whaling Grounds and the course usually taken by the "Humpback" and "Right Whale," from October to March.
By J. INNES WILSON
Figures 1, 2, 3, 4, 5, 6, denote Whaling Companies' Operations, 1909-10.
Nat. Scale 1 : 2,000,000 or 1 inch = 31.56 Stat. Miles.
Statute Miles :
10 0 10 20 30 40 50
HUMPBACK WHALE
October
November
December
January
February
March
RIGHT WHALE
HUMPBACK WHALE
RIGHT WHALE
January
February
March
1. 2. 3. 4. 5. 6.
C. North
Bird I.
Wallis I.
C. Buller
B. of Isles
C. Crewe
Possession B.
Antarctic B.
Fortuna B.
Studer's B.
Sorrowness B.
Cumberland B.
Cape Hull Hr.
C. George
New Fortune B.
Royal B.
C. Charlotte
Sandwich B.
Cooper I.
Green I.
C. Disappointment
C. Demidof
C. Nunes
C. Paradise
Wilson Hr.
King Edward Cove
Mt. Paget
Annenkof I.
Pickersgill I.
Novosilski G.
54°
55°
36°
37°
38°
Nat. Scale 1:1000,000 or 1 Inch = 15·78 Stat. Miles.
Statute Miles
5 0 5 10 15
37°30'
Welcome I.
Graigie Pt.
C. Alexandra
Elsa B.
Bird I.
C. Markham
Pr. Olaf B.
C. Constance
Best I.
Middle B.
South B.
Eagle Pt.
Wilson Hr.
C. Romer
Schlieper B.
St. John's Hr.
Undine Hr.
Coaling Hr.
Lucas Strand
King Haakon's Hr.
Sketch Map of N.W. part of SOUTH GEORGIA from the latest information received from whalers and sealers
54°30'
38°

"rocky" penguins, breed on the island. Numbers of other marine birds, such as the giant and stormy petrel and the Cape pigeon, frequent Bird island, but it is doubtful whether they breed in South Georgia. Passing Allardyce harbour on the south-east side of Cape Buller, we enter the Bay of Isles, so named from the seven small tussock islands dotted round the entrance. It is backed by bare hills, but the green dotted over its surface and along its margin makes it more pleasing than most of the coast. Proceeding round Cape Crewe, we come to the well-sheltered Prince Olaf harbour, with a small island at its entrance, making the inside all the more secure. Possession and Antarctic bays are wide and exposed openings facing the north-east, but good shelter can be obtained in certain parts, especially in the latter, where an exploring party from the Swedish Antarctic Expedition (from which the bay is named) landed in 1902. There is also a small king penguin rookery close to the entrance of this bay, and their eggs have been found newly laid as late as March (autumn), so that the habits of this bird must be singularly irregular. Fortuna bay—a magnificent bay facing the north-east—is rather open to the swell of the ocean. At the head and north-west side of this bay there are one or two very large glaciers, but the surrounding coast land is luxuriant with tussock grass. On the south-east side of Cape Saunders there is a small but very good acetylene flashlight, kept by the Tonsberg, Sandefjord, and South Georgia Whaling Companies. On a clear night this light can be seen at least 10 or 12 miles off the land. Proceeding southwards from Barff point, we pass the first two openings and enter the roomy St. George bay, which, like many otherwise good harbours on this coast, has the disadvantage of being too open to the north-east. The same may be said of Royal bay, though there is a small harbour inside this (Moltke harbour) where the German Scientific Expedition had their quarters in 1882–83; at certain times there are numerous seal here. Cooper island is a high tussock island about half a mile from the mainland; the passage between is quite safe for any ship to go through. From here to Cape Nunes the coast has been very little examined.

POLAR REGIONS.

Mr. Stackhouse's Visit to Jan Mayen.—With reference to the account of the Duchess of Bedford's visit to Jan Mayen, inserted in the November number of the *Journal* (p. 537), Mr. J. Foster Stackhouse sends us some notes on his own visit to the island, made in August of last year. They have reference chiefly to the glaciers, which, unlike Her Grace, Mr. Stackhouse found clear and full of colour, the South glacier in particular being seen shimmering in various colours for many miles. Going from south to north, the first glacier, Petersen, stops about 200 feet above sea-level. The next two, Wille and Grieg, are of about the same width on entering the sea. Friele glacier, which comes next, enters the sea with a front twice the width of the two last, and this is followed by one not shown on any chart, but which Mr. Stackhouse proposes to name after Dr. Charcot, who visited the island ten years ago. It is half as wide as the Wille glacier. The Dufferin glacier, thought by the Duchess of Bedford to have disappeared, still descends to sea-level, according to Mr. Stackhouse, in three narrow arms. In the extreme north, a new glacier has formed on the east side of Swend Foyn glacier. It is not very wide, but bad weather prevented a close approach. Mr. Stackhouse hopes, however, to visit the island again next July, and continue his investigations, possibly also climbing Mount Beerenberg. With regard to the steam supposed to be issuing from Egg Bluff crater in the photograph in the November number, Mr. Stackhouse quotes a

communication from Dr. Charcot, who visited the spot when in the island and found no trace of volcanic activity, to the effect that he does not feel convinced that the appearance is really due to steam, having himself been deceived by a similar appearance.

Russian Expeditions to Novaya Zemlya.—We learn from a Russian source that three different expeditions which had been sent to Novaya Zemlya in June, 1911, returned to Archangel on October 25. The leader of the first expedition, M. Russanof, has now visited Novaya Zemlya five times since 1907, including the occasion of the French expedition of 1908, during which he crossed the northern island from west to east. In 1909, as a member of Krammer's expedition, he explored the western coast as far as the Admiralty islands, and next year he went round the northern extremity of Novaya Zemlya—proving that, at least in certain years, navigation in these regions is possible (cf. *Journal*, vol. 37, p. 322). Last year, accompanied by Baron Tisenhausen and a Samoyede artist, M. Vylka, he made the circuit of the southern island in a motor-boat, carrying out surveys and geological explorations, during which he found most interesting Permian deposits on the south-east coast. The remains of a Russian settlement, the inhabitants of which perished, probably from scurvy, a hundred years ago, were found on the south coast. The second expedition, under the engineer Svitsyn, discovered copper-mines in Propashaya bay, but the commercial importance of this discovery is not yet quite established. The third expedition, under the engineer Ivanof, discovered indications of the presence of naphtha in Devonian rocks near the Chekin gulf of the Kara sea. All three expeditions have made rich botanical and zoological collections and very valuable geographical observations.

MATHEMATICAL AND PHYSICAL GEOGRAPHY.

The Second Cruise of the "Najade" in the Adriatic.—In the *Journal* for September, 1911, p. 322, we touched upon the results of the first seasonal cruise of the Austrian ship *Najade*, carried out early last year in connection with the new organization for the scientific investigation of the Adriatic. Some account of the second cruise, which took place between May 16 and June 4, has since been given in the *Mitteilungen* of the Vienna Geographical Society, 1911, No. 9. As in the former cruise, successive lines of observations were run in a transverse direction across the gulf, and though rough weather at times hampered the work (*e.g.* it was found inadvisable to complete the final section from Cattaro to Brindisi), the greater part of the programme was successfully accomplished. Among the principal results is the discovery (since confirmed by a later cruise in August) that the hitherto accepted figures for the greatest depths of the Adriatic are erroneous. They were based on soundings made in 1877, in about 41° 15′ N., 18° 15′ E.; but where these gave depths of from 1400 to 1645 metres (765 to 899 fathoms) the new soundings show depths varying from 1036 to 1132 metres (566 to 619 fathoms). The deepest part of the Adriatic seems therefore to lie further north than has been supposed, *i.e.* between Novi and Cattaro or Ragusa, though whether the old figure of some 1300 metres for this basin will stand the test of modern measurements remains to be seen. A variation in the contrary direction was introduced in the case of the Pomo depression, where 277 metres was found in place of a supposed maximum of 243. The results as regards salinity and temperature were also important, and brought out some striking differences from the conditions in February. The coast-water of low salinity was much more developed on the surface, and it was much cooler on the east than on the west side. Its

breadth varied greatly, branches of coast-water seeming to run out irregularly into the salter water of the open sea. The effects of the steady north-west wind on the circulation were clearly brought out in the shifting of the position of stretches of coast-water when that wind had been blowing some days. The presence of surface water of low salinity over the Pomo depression confirmed the idea that an outlier of Italian coast-water runs out in this direction from Ascoli. At the northern end of the gulf the variations in salinity were extremely sudden, showing that complex movements of the water exist. The lower temperature of the coast-water on the east is evidently due to its derivation from the underground waters of the Karst, while that on the west comes from the warmer river-water. The highest temperatures, both of coast and open sea water, were observed, not in the south, but in the north, the explanation in the case of the open sea-water being that in the south the layers are more mixed by wave-action. That, in May, the eastern half of the Adriatic is colder at the surface than the western is due to the northward flow of the colder deep-sea water on the east, and the southward flow of the warm shelf-water on the west. On the other hand, the coldest bottom water occurred on the Italian side, and as in this case the mixing action of the waves operates as a *warming* agency in the south, the bottom water is here warmer than in the north. The current observations showed a steady movement quite down to the bottom.

GENERAL.

The Eighteenth Congress of Americanists.—A further announcement respecting this Congress, which is to meet in London between May 27 and June 1 of this year (see *Journal*, vol. **38**, p. 81), has been issued. Membership is acquired by the payment of £1, which entitles the member to participate in all the functions and to receive the publications. Associates, who pay 10*s.*, do not have the right to vote or to receive publications gratis. Subscriptions may be paid in cash, or by money order or cheque, to the Assistant-Treasurer, J. Gray, Esq., c/o Royal Anthropological Institute, 50, Great Russell Street, W.C. Communications may be oral or written, and, according to the custom at these Congresses, may be in English, German, French, Italian, Spanish, or Portuguese. The time allowed for reading each paper is limited, as a rule, to 10 minutes, and in discussions 5 minutes is allowed to each speaker. The Secretary is F. C. A. Sarg, Esq., Royal Anthropological Institute.

OBITUARY.

Colonel Edmund Smyth.

By the death of Colonel Smyth, who became a Fellow of the Royal Geographical Society in 1869 and maintained his connection with it till 1905, more than one interesting link with the past has been severed. Edmund Smyth, a member of a well-known Lincolnshire family, was born on December 2, 1823. He was educated at Rugby, and has been immortalized by his contemporary, Thomas Hughes, in 'Tom Brown's School Days,' under the name of Crab Jones, "sauntering along with a straw in his mouth, the queerest, coolest fish in Rugby." He entered the Indian army in 1842, joining the 13th Regiment of Native Infantry, and went through the second stage of the Sikh war (1848–49), being

present at the passage of the Chenab and the battle of Gujerat. In 1854 he was in Switzerland with his brothers, the Rev. Christopher and the Rev. J. G. Smyth, both famous names in the annals of mountaineering, and climbed the Strahlhorn and the Ost-spitze of Monte Rosa, thereby commencing the long series of "first ascents" in the Alps accomplished by Englishmen during the succeeding decade. An interesting account of the latter expedition was rescued from oblivion by the late Mr. Edward Whymper, and is printed in his well-known 'Guide to Zermatt.' Edmund Smyth returned to India, and early in the sixties was appointed Inspector of Public Instruction in Garhwal and British Kumaon. He held this post till 1868, when he came home on furlough, and shortly afterwards retired from the service. In the course of his official and shooting trips he wandered far and wide among the almost untrodden mountain ranges of his district. "The natives," says Whymper, "used to say that he could climb where birds could not fly, which is the Oriental equivalent for 'Monsieur has the agility of a chamois.'" No doubt his Swiss experiences stood him in good stead. He crossed at least three glacier passes, Traill's pass, and the Ralum and Bhyundar passes, and was probably the first European to traverse the two latter. His own graphic narrative of the passage of the Bhyundar pass has been preserved in General Macintyre's 'Hindu Koh.' He found his way into Tibet more than once, and in one expedition, which is described at length in Mr. T. W. Webber's 'Forests of Upper India,' he penetrated to the base of Gurla Mandhata. The present writer, who crossed the Bhyundar pass a few years ago, had the pleasure of meeting Colonel Smyth last summer, and was amazed at the accurate and clear-cut recollection with which the aged veteran discussed the somewhat intricate topography of the region though his eyesight was too dim to allow him to use a map. He passed away quietly at Bordighera on October 26, having almost completed his eighty-eighth year. A. L. M.

Dr. R. D. Roberts.

Dr. R. D. Roberts, whose zealous work in the cause of education in this country is widely known, died suddenly, we regret to announce, on November 14. Educated at University College, London, and Clare College, Cambridge, and for some time lecturer in geology at the latter university, Dr. Roberts was perhaps best known in connection with the University Extension Movement, his association with which, begun in 1885, was maintained till his death. He was also concerned in other educational activities, and had lately for some time been busily employed as secretary to the Congress of the Universities of the Empire, which is to meet in London next summer. He had been a Fellow of this Society since 1908, and his sympathies and co-operation were freely given to all efforts for the improvement of geographical teaching in this country.

CORRESPONDENCE.

Geography in the 'Cambridge Medieval History.'

WILL you allow a Fellow of the Geographical Society to utter through the *Journal* a protest against the treatment accorded to geography in the 'Cambridge Medieval History,' of which the first volume, with its "portfolio" of maps, lies before him? In neither the volume nor the portfolio is due regard taken for geography.

The volume is the lesser offender. One of its chapters, "The Asiatic Background," by Dr. Peisker of Graz, really gives full recognition to geography and might claim admission to any geographical journal in the world. Prof. Haverfield opens his brief section on Roman Britain with a proportionate notice of geographical influences, and a few geographical paragraphs discuss the site of Constantinople. But for the rest, geography is ignored. In some chapters, such as those dealing with religion or philosophy, this is inevitable. But the details of the Völkerwanderungen were not seldom conditioned by factors such as mountain passes or soils yielding abundant food-supply, and here at least it is proper to bring out the relation of the Earth to the tribes which rushed to and fro upon it. Nothing of the sort is attempted.

Far more serious are the sins of the "portfolio." It may, of course, be argued that historical maps ought not to show physical features, if only because physical features combine ill with complicated territorial colouring. Freeman's 'Historical Geography,' at least in my copy (1882), admits no mountains at all to its maps, save that the concluding sheet breaks away from the rest and shows the Pyrenees in solitary state. But Freeman's book is not really a Historical Geography; it is a History of Political Boundaries. On the whole, I think it will be admitted that historical maps ought to take account of geography in so far as geography has conditioned the pieces of history illustrated by them, and that the physical features which they do include should be accurately and adequately shown.

What do we find in the Cambridge maps? The two first—which show the Eastern and Western empires about A.D. 400, are provided with a scale which tells us that, as University geographers reckon, the distance from London to Paris is 42 miles, from Rome to Genoa 51 miles, from Athens to Constantinople 69 or 70 miles. One of these maps is provided with a selection of mountains which, to me, seems arbitrary and meaningless: the other, perhaps more wisely, shows none at all. The third map, illustrative of Dr. Peisker's paper, embodies a much more serious attempt to recognize various forms of geographical features. But its execution is half-hearted and its choice of details is confusing. The thirteenth map, Roman Britain, also exhibits an effort to show mountains and plains; if the network of roads which covers it were not so black, it might claim to be an attractive and creditable piece of cartography. The rest of the maps are poor things in black and white, in which sea and land are hard to distinguish, in which the mountains are surprising, and the general arrangement of type, etc., repellent. The map of the Euphrates frontier (No. 7) is perhaps the worst. It is a combination of long vermicular oddly chosen mountain chains, of a complex of roads, and of names in various founts of type. Historically, the map seems accurate and scholarly; its failure is cartographic. If the worst, it does not stand alone. The treatment of the mountains is perhaps the weakest point in these maps. I take, for example, map 12 (Italy under the Ostrogoths). What is the use of showing the northern Apennines if you admit a gap in them of over 20 miles wide between Bologna and Lucca? As every one knows, the hills are somewhat lower and easier to cross hereabouts than at some points east and west, but the easiest crossing is not where this map shows its gap, and there is no sort of gap anywhere in the range. Had there been such a hole in the Apennine barrier, more than twice as broad as the Pass of Belfort and nearly as wide as our own "Midland Gate," the history of the Lower Arno valley and of most of Italy would have been singularly different. What, again, is the use of showing the western and central Alps if the eastern ranges are bodily left out? So far as this Cambridge University map is concerned, it would seem that a road or

railway running nearly in a bee-line from Vienna to Görz or Udine would pass through a perpetual plain.

It seems a serious disaster that a great University should treat a great subject so lightly. When the Clarendon Press issued Dr. Poole's Atlas, some of us grumbled that geography was very scantily recognized. But that was fifteen years ago, and, whatever its cartographic faults, Dr. Poole's Atlas did make some faint attempt to give us maps; sea and land were, at any rate, distinguishable in it. I think that those who examine the Cambridge "portfolio" will feel as I do, that we are now asked to be content with something which we should prefer not to call maps. When will the Universities learn that geography matters?

F. R. G. S.

MEETINGS OF THE ROYAL GEOGRAPHICAL SOCIETY, SESSION 1911-1912.

Second Meeting, November 20, 1911. The Right Hon. Earl CURZON OF KEDLESTON, G.C.S.I., G.C.I.E., etc., President, in the Chair.

ELECTIONS.—*Arthur Abbott; H.H. the Aga Khan, G.C.I.E.; Robert Duncan Arbuckle; Philip Henrich Bahr, M.A., M.R.C.S., L.R.C.P.; Benjamin W. Baker, M.A.; H.H. the Maharajah of Bikanir; George Borup; Horace John Bower; Alec. Raven Briggs; Louis Egerton Broome; Alfred Claude Bromhead; William H. Buchan, I.C.S.; Captain E. Burd* (93rd *Burma Infantry*); *Woodley Burrows; Rev. F. Carlisle Burton; Arthur Cleminson; Maurice Stanley Cockin; Ferdinando Stratford Collins; H. T. Cullis, I.C.S.; Hon. Francis N. Curzon; Captain Gerard Dalby* (60*th Rifles*); *Ernest Reding Day; Albert Morley Dell, B.A.; John B. Dewhurst; J. Edward Arthur Dick-Lauder; John Dunn; S. G. Dunn, M.A.; C. H. Edley-Morton; Leslie Elliot; Vincent T. J. Eyre; Horace Courtenay F. Finlayson; A. Fraustadt; James Gorman; Lieut. George Hamilton, R.N.R.; Commr. Charles F. Hart, R.N.R.; Lieut.-Col. W. C. Hedley, R.E.; Derwent Gordon Heslop; Dr. Arthur Holmes; John E. Bertram Horsfall; Captain C. A. Howard* (*King's Royal Rifles*); *Prof. Edward Hull, F.R.S.; Francis Reginald Hull; Joseph C. Hyam; George Skinner Ingram; Henry Plummer Ishmael; Col. Hugh Milbourne Jackson, R.E.; Blair Jaekel; Captain Algernon Jeffcoat, D.S.O.* (7*th R. Fusiliers*); *Henry Laming, M.A.; John F. Langan; Ivy L. Lee; Henry A. Leonard; John Napier List; Arthur Douglas Lumb; Graf Karl Ludwig Luxburg; Sir Reginald MacLeod, K.C.B.; Rev. Gabriel Reid Maguire; Alex. Addison McCoubrey; James Robert McKee; John Archibald Mackillop; Sir Alexander McRobert; Joseph Medill McCormick; Noel Thomas Methley; Rowland Miall; The Right Hon. Viscount Milner, G.C.B., G.C.M.G., etc.; Herman Alfred Moroney; E. H. Myddelton-Gavey, J.P.; His Highness Prince Ripudaman Singh, Tikka Sahib of Nabha; H.H. the Maharaja Ranjitsinhji, Jam Sahib of Nawanagar; Maharaja Sir Chandra Shum Shere, Jang Bahadur of Nepal, G.C.S.I.; Lieut. J. B. L. Noel* (*East Yorkshire Regiment*); *William Mathias Nootт; Captain Robert Bruère Otter-Barry* (*Royal Sussex Regt.*); *Walter Parnell-Smith; Charles Hector Parsons; Oswald Dalby Parker, LL.D.; Wilfred Pepper; Sir William Plender; A. W. Uglow Pope, C.I.E.; Charles Henry Rudge, C.E.; Sir Edward Sassoon, Bart., M.P.; Arthur Edward Sayer; Walter Sedgwick, M.A.; John Einar Selander; Alex. Jas. Mackintosh Shaw; Tom Ingham Spencer; Harry D. Sutheras, B.A.; George T. Thomas; William Thomas; Rev. George Bornin Thomson; H.H. the Maharaja*

of Travancore, G.C.S.I.; Major Robert Tytler (Gordon Highlanders); Robb de Peyster Tytus, M.A. (Yale University); J. G. Vergara y Velasco; Lord Wandsworth; Wm. Gambell Weeks; W. Chas. Whitham; Raleigh Alban Kenneth Wilson; John Fell Woodburne; C. W. Wallace.

The paper read was:—

"Volcanic Craters and Explosions." By Dr. Tempest Anderson.

Third Meeting, December 4, 1911. Admiral Sir LEWIS BEAUMONT, G.C.B., K.C.M.G., Vice-President, in the Chair.

ELECTIONS.—*Thomas Henry Bankier; Lionel Charles Bastow; John Boyes; Cordell W. Firebrace; Sidney Percy Inskipp; Sir Alexander Kennedy, F.R.S., LL.D.; H. A. Lorentz, LL.D.; Lieut. Kenneth Mason, R.E.; George Alexander Richardson; Joel Cyrus Rogers; Frank Kingdon Ward; Frederick White; Alexander Hayman Wilson.*

The Paper read was:—

"The Geography and Economic Development of British Central Africa." By Sir Alfred Sharpe, K.C.M.G., C.B.

GEOGRAPHICAL LITERATURE OF THE MONTH.

Additions to the Library.

By EDWARD HEAWOOD, M.A., *Librarian*, R.G.S.

The following abbreviations of nouns and the adjectives derived from them are employed to indicate the source of articles from other publications. Geographical names are in each case written in full:—

A. = Academy, Academie, Akademie.
Abh. = Abhandlungen.
Ann. = Annals, Annales, Annalen.
B. = Bulletin, Bollettino, Boletim.
Col. = Colonies.
Com. = Commerce.
C.R. = Comptes Rendus.
E. = Erdkunde.
G. = Geography, Géographie, Geografia.
Ges. = Gesellschaft.
I. = Institute, Institution.
Iz. = Izvestiya.
J. = Journal.
Jb. = Jahrbuch.
Jber. = Jahresbericht.
k.k = kaiserlich und königlich.
M. = Mitteilungen.
Mag. = Magazine.
Mem. (Mém.) = Memoirs, Mémoires.
Met. (mét.) = Meteorological.
P. = Proceedings.
R. = Royal.
Rev. = (Riv.) = Review, Revue, Rivista.
S. = Society, Société, Selskab.
Sc. = Science(s).
Sitzb. = Sitzungsbericht.
T. = Transactions.
Ts. = Tijdschrift, Tidskrift.
V. = Verein.
Verh. = Verhandlungen.
W. = Wissenschaft, and compounds.
Z. = Zeitschrift.
Zap. = Zapiski.

On account of the ambiguity of the words *octavo*, *quarto*, etc., the size of books in the list below is denoted by the length and breadth of the cover in inches to the nearest half-inch. The size of the *Journal* is 10 × 6½.

A selection of the works in this list will be noticed elsewhere in the "Journal."

EUROPE.

Adriatic. **Merz.**

Die Adria. Von Dr. Alfred Merz. (Privatdozent an der Universität, Abteilungsvorstand am Institut für Meereskunde zu Berlin.) [Berlin, 1911.] Size 8 × 5¼, pp. 14. *Sketch-map.*

Alps. **Schuster.**

Peaks and pleasant pastures. By Claud Schuster. Oxford: Clarendon Press, 1911. Size 9 × 6, pp. 228. *Maps. Price 7s. 6d. net. Presented by the Publishers.*

Alps—Adamello Group. *M.V. Geographen Univ. Leipzig* **1** (1911): 57–66. **Lehmann.**

Beitrag zur Anthropogeographie der Alpen. Die Ständige Siedlungen an der Adamellogruppe und die Bodenformen. Von Dr. Otto Lehmann.

Alps—Col de Clapier. **Coolidge.**

Il Colle Clapier nella Storia. Di Rev. W.-A.-B. Coolidge. (Estratto dalla *Rivista del Club Alpino Italiano*, vol. **30**, No. 6, 1911.) Turin, 1911. Size 9½ × 7, pp. 8.

Alps—Geology. *Scottish G. Mag.* **27** (1911): 393–417. **Geikie.**

The architecture and origin of the Alps. By Prof. Jas. Geikie. *Sketch-map, Illustrations, and Sections.*

Alps—Glacier. *Riv. G. Italiana* **18** (1911): 267–278. **Ricci.**

Prime osservazioni fisiche sul ghiacciaio del Trobio (Alpi Bergamasche). Di Leonardo Ricci. *Sketch-maps and Illustrations.*

Alps—Mont Blanc. **Coolidge.**

La Chaîne du Mont Blanc, avant 1800. Notes supplémentaires. Par W.-A.-B. Coolidge. (Extrait de la *Revue Alpine* de Juillet 1911.) Lyon, 1911. Size 9½ × 6, pp. 12.

Alps—Mont Blanc. *Alpine J.* **25** (1911): 608–640. **Montagnier.**

A Bibliography of the Ascents of Mont Blanc from 1876 to 1853. By Henry F. Montagnier.

Alps—Morphology. *C.R.A. Sc. Paris* **153** (1911): 309–312. **Martonne.**

Principes de l'analyse morphologique des niveaux d'érosion appliquée aux vallées Alpines. Par Em. de Martonne.

Alps—Seismology. *Beiträge zur Geophysik* **11** (1911): 1–105. **Christensen.**

Seismologische Studien im Gebiete der Ostalpen. Von Adolf Christensen. *Sketch-maps.*

Austria—Alps. *B.S.G. Lille* **56** (1911): 9–31, 65–87. **Eisenmenger.**

Les Alpes orientales et les pays compris entre le Danube et l'Adriatique. Par M. G. Eisenmenger. *Sketch-maps and Illustrations.*

Austria—Galicia—Meteorology. **Weigt.**

R.A. Cracow, Sprawozd. Kom. Fizyograf. **44** (1910): 81–115.

The daily variation of temperature at Cracow, from observations of twenty-eight years. By H. Weigt. [In Polish.]

Austria—Lunzer Seen. **Götzinger.**

Die Sedimentierung der Lunzer Seen. Von Dr. Gustav Götzinger. (Separat-Abdruck aus den *Verhandlungen der k.k. geolog. Reichsanstalt*, 1911, No. 8.) Vienna, 1911. Size 10 × 7, pp. 173–208. *Sketch-maps and Diagrams.*

Will be noticed in the Monthly Record.

Austria—Tirol. *M.G. Ges. München* **6** (1911): 97–166. **Distel and Scheck.**

Das Plateau des Zahmen Kaisers. Kartographisch-morphologische Studie. Von L. Distel und F. Scheck. *Map and Illustration.*

Danube. **Jerrold.**

The Danube. By Walter Jerrold. London: Methuen & Co., [1911]. Size 9 × 5½, pp. xiv. and 316. *Illustrations. Price 10s. 6d. net.*

France—Alps—Hydrology. **Ministère de l'Agriculture.**

Ministère de l'Agriculture: Direction de l'Hydraulique et des Améliorations agricoles. Service des grandes forces hydrauliques dans la région des Alpes. Tome iv.: Résultats des études et travaux à la fin de 1910. [Paris, 1911.] Size 11 × 7, pp. 556. *Illustrations and Diagrams; also Two Portfolios of Maps and Profiles, as Annexes.*

France—Guides. **Rouy.**

Guides Flammarion. Publiés sous la direction de G. Rouy. Paris: E. Flammarion, [1911]. Size 7 × 4½, pp. *Sketch-map, Plans, and Illustrations. Price (per vol.) 2 fr. 50. Presented by the Publisher.*

Les Ardennes et les Vosges, de Mézières-Charleville à Givet, Nancy, Belfort, Langres, Epinal (pp. 142).

La Bretagne du Mont-Saint-Michel à l'embouchure de la Loire (pp. 132).
La Normandie (2 vols.). Du Mont-Saint-Michel à l'embouchure de la Seine; Jersey (pp. 142); De l'embouchure de la Seine au Tréport (pp. 142).
L'Auvergne, le Velay, et Vichy: Allier, Puy-de-Dome, Cantal, Haute-Loire (pp. 118).
Les Alpes françaises: Dauphiné, Savoie, Haute-Savoie, Hautes-Alpes (pp. 188).
Languedoc et Roussillon: les Pyrénées de Capvern à la Mediterranée (pp. 148)
La Côte d'Argent: les Pyrénées de l'Océan à Bagnères-de-Bigorre (pp. 144).

France—Jura. **Martin.**

Le Jura méridional: étude de géographie physique, spécialement appliquée au Bugey. Par l'abbé J.-B. Martin. [Extrait de la Revue de Géographie Annuelle, Tome iv.] Paris: Ch. Delagrave, 1910. Size 9 × 7, pp. 220. *Maps, Illustrations, and Sections. Price 7 fr. 50. Presented by the Publisher.*

Germany—Württemberg. **Engel.**

Geologischer Exkursionsführer durch Württemberg. Unter Mitwirkung heimischer Geologen herausgegeben von Dr. Th. Engel. Stuttgart: E. Schweizerbart, 1911. Size 8 × 5½, pp. viii. and 182. *Illustrations and Sections. Price 3s.*

Russia—Baltic coasts. **Kupffer.**

Baltische Landeskunde. In Verein mit mehreren Mitarbeitern herausgegeben von K. R. Kupffer. Riga: G. Löffler, 1911. Size 10 × 6½, pp. xvi. and 558. *Maps and Illustrations. Price 14 m. 50. Presented by the Publisher.*

Southern Europe—Riviera. **Reynolds-Ball and Payton.**

Sport on the Rivieras. Edited by Eustace Reynolds-Ball and C. A. Payton. London: Reynolds-Ball's Guides, 1911. Size 7 × 4½, pp. xvi. and 240. *Map and Illustrations. Price 2s. 6d. net. Presented by the Publishers.*

Spain. **Calvert.**

Sculpture in Spain. By Albert F. Calvert. London: J. Lane, 1912 [1911]. Size 8 × 5, pp. xiv. and 174. *Illustrations. Price 3s. 6d. net. Presented by the Publisher.*

This volume of the Spanish series is likely to prove useful to travellers in Spain interested in sculpture, and desirous of knowing something about the history and best examples of the art in that country.

Spain. **Calvert.**

The traveller's handbook for Spain. By Albert F. Calvert. London: T. Cook & Son, 1912 [1911]. Size 7 × 4½, pp. xii. and 624. *Maps, Plans, and Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

Turkey. **Pears.**

Turkey and its people. By Sir Edwin Pears. London: Methuen & Co. (1911). Size 9 × 5½, pp. vi. and 410. *Price 12s. 6d. net.*

United Kingdom—Meteorology. **Meteorological Office.**

Meteorological Office, London. Summaries of Results of Geophysical and Meteorological Observations in the year ended December, 1910, at Kew Observatory, Richmond, Surrey; Falmouth Observatory, Cornwall; Valencia Observatory, County Kerry, Ireland; Eskdalemuir Observatory, Dumfriesshire; in continuation of the Reports of the Observatory Department of the National Physical Laboratory, 1900–1909, the Kew Committee of the Royal Society, 1872–1899, and of the Kew Observatory Committee of the British Association, 1842–1871. Teddington, 1911. Size 10½ × 7½, pp. 52. *Presented by the Meteorological Office.*

United Kingdom—Scotland. *Scottish G. Mag.* 27 (1911): 281–291, 359–368. **Stewart.**

Notes on changes in the Highland District of Appin on Tayside. By John Stewart.

United Kingdom—South-West England. **Bickley.**

Where Dorset meets Devon. By Francis Bickley. London: Constable & Co., 1911. Size 9 × 6, pp. x. and 268. *Illustrations. Price 7s. 6d. net. Presented by the Publishers.*

United Kingdom—Topography. **Fordham.**

An Itinerary of the Sixteenth Century. La Guide des Chemins d'Angleterre. Jean Bernard, Paris, 1579. By Sir Herbert George Fordham. Cambridge, 1910. Size 8½ × 5½, pp. 10.

ASIA.

China. **Dingle.**

Across China on foot: life in the interior and the reform movement. By Edwin J. Dingle. Bristol: J. W. Arrowsmith (London: Simpkin & Co.), [1911]. Size 9 × 5½, pp. xvi. and 446. *Map and Illustrations. Price* 16*s. net.*

China. **Geil.**

Eighteen capitals of China. By William Edgar Geil. London: Constable & Co., 1911. Size 9 × 6, pp. xx. and 430. *Plans and Illustrations. Price* 21*s. net. Presented by the Publishers.*

China—Iron ore. *J.G. Tōkyō G.S.* **23** (1911): 299–311. **Inouye.**

Iron Ore of China. By K. Inouye. *Map.* [In Japanese.]

China—Railways. *B.S.G. Comm. Paris* **33** (1911): 483–494. **Lapeyrière.**

Situation des chemins de fer en Chine au 1er Janvier 1911. Par J. de Lapeyrière. *Map.*

China, Western. *La G., B.S.G. Paris* **24** (1911): 1–30. **Audemard.**

Exploration hydrographique du Ya-long et du Yang-tseu Supérieur. Par L. Audemard. *Map and Illustrations.*

Captain Audemard accompanied the Comte de Polignac (*Journal*, vol. **37**, pp. 211).

Chinese Empire. *B.S.G. Marseille* **34** (1910): 39–52. **Ollone.**

La Mission d'Ollone (1906–1909). Chine Occidentale, Tibet, Mongolie. Par Commandant d'Ollone. *Sketch-map.*

Chinese Empire—Manchuria. *J.G. Tōkyō G.S.* **23** (1911): 164–176. **Inouye.**

The Iron Ore of Southern Manchuria. By K. Inouye. *Map.* [In Japanese.]

French Indo China. **Pavie.**

Mission Pavie Indo-Chine, 1879–1895. Géographie et Voyages, Tome vi: Passage du Mé-khong au Tonkin (1887 et 1888). Par Auguste Pavie. Paris: E. Leroux, 1911. Size 11 × 8½, pp. 352. *Maps and Illustrations. Presented for M. Auguste Pavie.*

French Indo-China—Laos. *B. Économique* (Indo-Chine) **14** (1911): 285–330. **Baudenne.**

A travers le Laos. (Guide à l'usage des voyageurs). Par A. Baudenne. *Map.*

India. **Fisher.**

Through India and Burmah with pen and brush. London: T. Werner Laurie, [1911]. Size 9 × 5½, pp. xii. and 358. *Illustrations. Price* 15*s. net. Presented by the Publisher.*

India—Kashmir. **Neve.**

Beyond the Pir Panjal: life among the mountains and valleys of Kashmir. By Dr. Ernest F. Neve. London: T. Fisher Unwin, 1912 [1911]. Size 9 × 6, pp. 320. *Sketch-maps and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

India—Nilgiris. **Fletcher.**

Sport on the Nilgiris and in Wynaad. By F. W. F. Fletcher. London: Macmillan & Co., 1911. Size 9 × 6, pp. xx. and 456. *Map and Illustrations. Price* 12*s. net. Presented by the Publishers.*

India—Surveys. **Survey of India.**

Account of the operations of the Great Trigonometrical Survey of India. Vol. 19. Levelling of precision in India (1858–1909). By Colonel S. G. Burrard (pp. xiv. and 484). Vol. 19 A.: Descriptions and heights of bench-marks on the southern lines of levelling (pp. iv. and 524). Vol. 19 B.: Descriptions and heights of bench-marks on the northern lines of levelling (pp. iv. and 520). Dehra Dun, 1910. Size 12 × 9½. *Maps, Illustrations, and Diagrams. Presented by the Survey of India.*

Russia—Siberia. *Petermanns M.* **57** (1911) [ii.]: 11–14, 67–71. **Shitkof.**

Die Erforschung der Samojedenhalbinsel (Jamal). Von B. M. Shitkow. *Map.*

See note on p. 73, *ante*.

Russia—Transcaucasia. *M. Kaukasischen Museums* **5** (1911): 171–216. **Shelkovnikof.**

Bericht über eine Reise nach Zuvant in Juli, 1906. Von A. B. Schelkovnikov. [In Russian; German *résumé*.]

Tibet—Place-names. *Petermanns M.* **57** (1911) [ii.]: 8–10. **Schulemann.**
Ueber einige geographische Namen Tibets und ihre Rechtschreibung. Von Günther Schülemann.

Turkey. *Petermanns M.* **57** (1911) [ii.]: 81. **Oppenheim.**
Die zweite Forschungsreise von Dr. Max Frhrn. v. Oppenheim in der Asiatischen Türkei. *Maps.*

The journey referred to is that of 1899, the cartographical results of which, as finally worked up, are now presented for the first time, in three instalments.

Turkey—Jerusalem. ——

Underground Jerusalem: discoveries on the hill of Ophel (1909–11). By H. V. London: H. Cox, 1911. Size 12½ × 10, pp. viii. and 42. *Plans, Illustrations, and Sections. Price 7s. 6d. net. Presented by the Publisher.*

Jerusalem sous terre: les recentes fouilles d'Ophel. Décrites par H. V. London: H. Cox, 1911. Size 12½ × 10, pp. vi. and 46. *Plans, Illustrations, and Sections. Price 10 fr. Presented by the Publisher.*

Turkey—Mesopotamia—Archæology. **(Hilprecht.)**

The Babylonian expedition of the University of Pennsylvania. Series A: Cuneiform texts, edited by H. V. Hilprecht. Vol. **3**, Part I. (pp. xii. and 146); Vol. **6**, Part I. (pp. x. and 90), Part II. (pp. xvi. and 164); Vol. **8**, Part I. (pp. viii. and 86); Vol. **9** (pp. 90); Vol. **10** (pp. xx. and 96); Vol. **14** (pp. x. and 86); Vol. **15**. (pp. xii. and 68); Vol. **17**, Part I. (pp. xvi. and 174); Vol. **20**, Part I. (pp. xviii. and 70); Vol. **29**, Part I. (pp. x. and 88). Philadelphia, 1898–1911. Size 12½ × 9½. *Illustrations.*

The same, Series D: Researches and treatises, edited by H. V. Hilprecht. Vol. **1**: The excavations in Assyria and Babylonia. By H. V. Hilprecht (pp. xx. and 578); Vol. **3** (pp. xiv. and 256); Vol. **4** (pp. xxviii. and 324). Philadelphia, 1904–07. Size 9½ × 6½. *Maps, Plans, and Illustrations. Presented by the University of Pennsylvania.*

Turkey—Syria. *P.S. Biblical Archæology* **33** (1911): 171–179. **Sayce.**
Notes on an Unexplored District of Northern Syria. By Prof. A. H. Sayce. *Sketch-map.*

Western Asia—Metals. *Rev. Ethnographie et Sociologie* **2** (1911): 4–9. **Morgan.**
Les métaux précieux dans l'Asie antérieure depuis les temps les plus reculés jusqu'à nos jours. Par J. de Morgan.

Western Asia—Railways. *Imp. Asiatic Quart. Rev.* **31** (1911): 225–249. **Lynch.**
Railways in the Middle East. By H. F. B. Lynch.

AFRICA.

Abyssinia—Morphology. *M.G. Ges. München* **6** (1911): 222-310. **Rathjens.**
Beiträge zur Landeskunde von Abessinien. Von Carl Rathjens. *Maps, Sections, and Illustrations.*

Africa—Climate. **Knox.**
The climate of the continent of Africa. By Alexander Knox. Cambridge: University Press, 1911. Size 9½ × 6½, pp. xiv. and 552. *Maps and Diagrams. Price 21s. net. Presented by the Publishers.*

Africa—Fauna. *Petermanns M., Ergänzungsheft*, No. 171 (1911): pp. 84. **Engell.**
Verbreitung und Häufigkeit des Elefanten und Löwen in Afrika. Von Priv.-Doz. Dr. M. C. Engell. *Map.*

Africa—Game. ——

Africa. Further correspondence relating to the preservation of wild animals in Africa. London: Wyman & Sons, 1911. Size 13½ × 8½, pp. 4 and 34. *Maps.*

Chiefly concerned with the part played by game in furthering the spread of disease-carrying organisms. The maps show the game reserves in the Uganda Protectorate. (See November number, 1911, p. 532.)

Africa—Railway. *B.S.G. Lisboa* **29** (1911): 71–92. **Mattos.**
Um concorrente do porto de Lisboa que é para receiar. Por Mello de Mattos.

On the project of a railway down the west coast of Africa to serve as a link in the communications between Europe and South America. The author points out that it would divert traffic from the port of Lisbon.

Algeria. **Jonnart.**

Exposé de la situation générale de l'Algérie. Présenté par M. C. Jonnart, 1909. Algiers, 1910. Size 9½ × 6, pp. 532. *Diagrams. Presented by the Author.*

Algeria. **Hyam.**

The illustrated guide to Algiers and Algeria (together with a chapter on Morocco). A practical handbook for travellers by Joseph C. Hyam. 8th edit. Algiers: Hyam & Co., 1911. Size 7½ × 5, pp. xii. and 228. *Maps, Plan, and Illustrations. Price 6s. Presented by the Editor.*

Algeria and Tunis—Rivers. *Ann. de G.* **20** (1911): 351–366. **Gautier.**

Profils en long de cours d'eau en Algérie-Tunisie. (*Premier article.*) *Sections.*

Belgian Congo. *Mouvement G.* **28** (1911): 427–430. **Wauters.**

Comment les eaux der Tanganika s'écoulent dans la Lukuga par le col de Mitwanzi. Par A.-J. W[auters]. *Sketch-map.*

Belgian Congo—Katanga. *Mouvement G.* **28** (1911): 523–533. **Droogmans.**

La situation au Katanga. Rapport de M. H. Droogmans, président du "Comité spécial." *Sketch-map.*

Belgian Congo—Kundelungu Hills. *Mouvement G.* **28** (1911): 451–456. **Deladrier.**

Les Kundelungu. Par E. Deladrier.

Egypt—Nubia—Archæology. **Woolley.**

University of Pennsylvania: Egyptian Department of the University Museum. Eckley B. Coxe Junior expedition to Nubia. Vol. 5: Karanog; the town. By C. Leonard Woolley. Philadelphia, 1911. Size 11 × 8½, pp. xiv. and 52. *Plans, and Illustrations. Presented by the University of Pennsylvania.*

Egypt and the Sudan. **Budge.**

Cook's Handbook for Egypt and the Egyptian Sûdân. By E. A. Wallis Budge. 3rd edit. London: T. Cook & Sons, 1911. Size 7 × 4½, pp. xx. and 950. *Maps, Plans, and Illustrations. Price* 10*s. net. Presented by the Publishers.*

French Equatorial Africa. **Deschamps.**

Capitaine Deschamps. De Bordeaux au Tchad par Brazzaville (notes de voyages et de campagnes). Paris: Société Française d'Imprimerie, 1911. Size 11 × 7½, pp. x. and 310. *Sketch-maps and Illustrations. Price 7 fr. Presented by the Publishers.*

Madagascar—Meteorology. **Colin.**

Observatoire de Madagascar. Observations météorologiques faites à Tananarive. Par le R. P. E. Colin. 21e volume, 1909. Antananarivo, 1911. Size 9 × 6, pp. vi. and 274.

Morocco—Riff. **Artbauer.**

Die Rifpiraten und ihre Heimat: erste Kunde aus verschlossener Welt. Von Otto C. Artbauer. Stuttgart: Strecker und Schröder, 1911. Size 9 × 6, pp. viii. and 224. *Sketch-maps, Plans, and Illustrations. Price 4s. 3d.*

Nigeria. **Falconer.**

On horseback through Nigeria, or Life and travel in the Central Sudan. By Dr. J. D. Falconer. London: T. Fisher Unwin, 1911. Size 9 × 5½, pp. 312. *Sketch-map and Illustrations. Price* 12*s. 6d. net. Presented by the Publisher.*

North Africa. **Fraser.**

The land of veiled women: some wanderings in Algeria, Tunisia, and Morocco. By John Foster Fraser. London: Cassell & Co., 1911. Size 8 × 5, pp. viii. and 288. *Illustrations. Price 6s. Presented by the Publishers.*

Portuguese East Africa. *B.S.G. Lisboa* **29** (1911): 143–163. **De Amorim.**

A occupação do districto de Moçambique. Por Massano de Amorim.

Rhodesia—Ethnology. **Hall.**

Rhodesia Museum, Bulawayo. What visitors can see. Ethnological section. Part I. Illustrative of the Life, Religions, Customs, Arts and Industries, and Traditions of the Past and Present Native Races of Southern Rhodesia, and of Asiatic and European Peoples in these Territories, to which is added the Bushman Paintings at Maatcsjemshlope and Hillside, near Bulawayo. By R. N. Hall. Bulawayo, 1911. Size 8½ × 5½, pp. 62. *Illustrations.*

South Africa. *Rep. Brit. Ass. Sheffield* 1910 (1911): 160–165. **Hatch.**
Topographical and Geological Terms used locally in South Africa. (Drawn up by Dr. F. H. Hatch.)

Tunis and Tripoli. *La G., B.S.G. Paris* **23** (1911): 417–438. **Pervinquière.**
A Ghadamès. Par Léon Pervinquière. *Illustrations.*
See note in vol. **38**, p. 317.

West Africa. *B.S.G. Lille* **55** (1911): 321–345. **Gironcourt.**
Mission en Afrique occidentale. Des pays Touareg du Niger à la Côte de l'Or par le Haut-Togo. Par M. G. de Gironcourt. *Portrait, Sketch-map, and Illustrations.*

West Africa. *T. Liverpool G.S.* 1910 (1911): 7–14. **Guggisberg.**
Mapping the Gold Coast and Ashanti. By Major F. G. Guggisberg.

West Africa—Exploration. **Johnston.**
Pioneers in West Africa. By Sir Harry Johnston. London: Blackie & Son, 1912 [1911]. Size 8½ × 5, pp. 336. *Sketch-maps and Illustrations. Price* 6*s. Presented by the Publishers.*

NORTH AMERICA.

Alaska—Geology. *U.S. Geol. Surv. B.* **449** (1911): pp. 146. **Smith and Eakin.**
A geologic reconnaissance in South-eastern Seward Peninsula and the North Bay—Nulato region, Alaska. By Philip S. Smith and H. M. Eakin. *Maps, Illustrations, Diagrams, and Sections.*

Alaska—Glaciers. *National G. Mag.* **22** (1911): 537–561. **Martin.**
The National Geographic Society researches in Alaska. By Lawrence Martin. *Sketch-maps and Illustrations.*

Bermuda—Geology. *Geol. Mag.* V. **8** (1911): 385–395, 433–442. **Bullen.**
Some notes on the Geology of the Bermuda islands. By R. Ashington Bullen. *Sketch-map, Sections, and Illustrations.*

Canada—Alberta—Climate. **Stupart.**
P. and T.R.S. Canada **4** (1910–11): Sect. III., 51–52.
The Chinook in Southern Alberta and Temperature Inversions at Sulphur Mountain, Banff. By R. F. Stupart. *Diagrams.*

Canada—Exploration. **Johnston.**
Pioneers in Canada. By Sir Harry Johnston. London: Blackie & Son, 1912 [1911]. Size 8½ × 5½, pp. 328. *Sketch-maps and Illustrations. Price* 6*s. Presented by the Publishers.*

Canada—Geophysics. **Klotz.**
Department of the Interior. Report of the Chief Astronomer, 1909. Appendix No. I. Seismology, Terrestrial Magnetism, and Gravity. By Dr. Otto Klotz. Ottawa, 1911. Size 10 × 6½, pp. 142. *Maps, Diagrams, and Illustration.*

Canada—Historical. *P. and T.R.S. Canada* **4** (1910–11): Sect. I., 45–56. **Sulte.**
Les Bretons en Canada. Par Benjamin Sulte.

Canada—Hudson Bay. **Prud'homme.**
P. and T.R.S. Canada **4** (1910–11): Sect. I., 17–40.
La Baie d'Hudson. Par M. le juge L.-A. Prud'homme.

Canada—Lake-ice. *T. Canadian I.* **9** (1910): 13–21. **Tyrrell.**
Ice on Canadian Lakes. By J. B. Tyrrell. *Illustrations.*

Canada—Place-names. *P. and T.R.S. Canada* **4** (1910–11): Sect. IV., 37–40. **White.**
Place-names in Northern Canada. By James White.

Canada—Railway. **Talbot.**
The making of a great Canadian railway; the story of the search for and discovery of the route, and the construction of the nearly completed Grand Trunk Pacific Railway from the Atlantic to the Pacific, with some account of the hardships and stirring adventures of its constructors in unexplored country. By Frederick A. Talbot. London: Seeley, Service, & Co., 1912 [1911]. Size 9 × 5½, pp. 350. *Sketch-map and Illustrations. Price* 16*s. net. Presented by the Publishers.*

Canada—Rockies. **Coleman.**

The Canadian Rockies: new and old trails. By Dr. A. P. Coleman. London: T. Fisher Unwin, 1911. Size 9 × 6, pp. 384. *Maps and Illustrations. Price* 12*s.* 6*d. net. Presented by the Publisher.*

Canada—Rocky Mountains. *National G. Mag.* **22** (1911): 509–521. **Walcott.**

A Geologist's Paradise. By Charles D. Walcott. *Illustrations and Panoramic View.*

Canada—St. Lawrence. *P. and T.R.S. Canada* **4** (1910–11): Sect. II., 25–54. **Wood.**

Laurenciana. By Lieut.-Colonel William Wood.

Canada—Yukon. **Sheldon.**

The wilderness of the Upper Yukon: a hunter's explorations for wild sheep in sub-Arctic mountains. By Charles Sheldon. London: T. Fisher Unwin, 1911. Size 9½ × 6, pp. xxii. and 354. *Maps and Illustrations. Price* 12*s.* 6*d. net.*

Great Lakes. **Johnson.**

Highways and byways of the Great Lakes. By Clifton Johnson. New York (London: Macmillan & Co.), 1911. Size 8 × 5½, pp. xiv. and 328. *Illustrations. Price* 8*s.* 6*d. net. Presented by the Publishers.*

Labrador. **Prichard.**

Through trackless Labrador. By H. Hesketh Prichard. London: W. Heinemann, 1911. Size 10 × 7½, pp. xvi. and 254. *Sketch-map and Illustrations. Price* 15*s. net. Presented by the Publisher.*

CENTRAL AND SOUTH AMERICA.

Argentine. **Huret.**

Jules Huret. En Argentine: de Buenos-Aires au Gran Chaco. Paris: E. Fasquelle, 1911. Size 7½ × 5, pp. 530. *Price* 3 *fr.* 50. *Presented by the Publisher.*

Argentine—Earthquake. *B.I.G. Argentino* **25** (1911) (Parts 3–4): 104–122. **Negri.**

El terremoto de Mendoza del 20 de Marzo de 1861. Por Dr. Galdino Negri.

Bolivia—Cercado. **Paredes.**

B. Ofic. Nacional Estadística, Bolivia, 1910: 614–667; 1911: 1–18.

Descripción de la Provincia del Cercado. Por Rigoberto Paredes.

Brazil—Araguaya. *Rev. I. hist. e.g. Brazil* **78** (1910): Pt. 1, 259–275. **Krause.**

A viagem do Dr. Fritz Krause ao Araguaya, 1909.

Referred to in the Monthly Record, December, 1911, p. 627.

Brazil—Maranhão—Ports. **Ministerio da Viação.**

B. Minist. Viação e Obras Publs. (Brazil) **5** (1910): 7–74.

Memoria justificativa do Projecto e Orçamento do Porto de Itaqui, Estado do Maranhão. (Commissão Fiscal e Administrativa das Obras do Porto do Rio de Janeiro: Sub-Commissão de Estudos do Porto de Itaqui.) *Maps, Plans, Illustrations, and Diagrams.*

Brazil—São Paulo. **Commissão Geographica.**

Commissão Geographica e Geologica do Estado de S. Paulo. Exploração do Rio Juqueryquerê. S. Paulo, 1911. Size 18 × 13, pp. iv. and 20. *Map and Illustrations. Presented by the Commission.*

Brazil—São Paulo. **Vasconcellos.**

Sociedade de Geographia de Lisboa: Missão ao Brazil. A cidade e o estado de S. Paulo. Por Ernesto de Vasconcellos. Lisbon, 1911. Size 9 × 6, pp. 44.

Brazil and Paraguay. *M.G. Ges. München* **6** (1911): 18–44. **Carnier.**

Reisen in Matto Grosso und Paraguay. Von Karl Carnier. *Illustrations.*

Central America. **Keane and Markham.**

Stanford's Compendium of Geography and Travel. (New Issue.) Central and South America. Vol. 2: Central America and West Indies. By Dr. A. H. Keane; edited by Sir Clements Markham. London: E. Stanford, 1911. Size 8 × 5, pp. xxvi. and 496. *Maps and Illustrations. Price* 15*s. Presented by the Publisher.*

Chile—Meteorology. **Dirección de Territorio Marítimo.**

República de Chile. Anuario del Servicio Meteorológico de la Dirección del Territorio Marítimo. Tomo Undécimo, correspondiente al Año 1909. Valparaiso,

1910. Size 10½ × 7½, pp. iv. and 452. *Diagrams. Presented by the Dirección del Territorio Marítimo, Valparaiso.*

Colombia—Earthquake. *Beiträge z. Geophysik* **11** (1911): 132–199. **Rudolf and Szirtes.**

Das kolumbianische Erdbeben am 31. Januar 1906. Von E. Rudolf und S. Szirtes. *Sketch-maps.*

Colombia—Survey. **Nieto.**

B. Ministerio Relaciones Exteriores, Colombia **3** (1910): 194–240.

Oficina de Longitudes. Por Julio Garzón Nieto. *Illustrations.*

Account of surveys carried out by this newly organized department. (See *Journal*, vol. **38**, p. 533.)

Paraná—Guayra Falls. *Blackwood's Mag.* **190** (1911): 682–688. **Russell.**

A journey to the falls of Guayrá. By Claud Russell.

A note on this journey appeared in the *Journal*, vol. **37**, p. 565.

Patagonia—Cordillera. **Quensel.**

Beitrag zur Geologie der patagonischen Cordillera. Von P. D. Quensel. (Sonderabdruck aus *Geologische Rundschau*, Band I. Heft 6.) Leipzig, 1910. Size 9 × 5½, pp. 297–302.

Peru. **Martin.**

Peru of the twentieth century. By Percy F. Martin. London: E. Arnold, 1911. Size 9 × 5½, pp. xxv., 348. *Map and Illustrations. Price* 15*s. net. Presented by the Publisher.*

Peru—Historical. **Perrier.**

Les Académiciens au Pérou (1735-1744). Par le Capitaine G. Perrier. (Extrait du *Bulletin de la Société Astronomique de France*, Mars et Avril 1911.) Paris, [1911]. Size 9½ × 6½, pp. 34. *Sketch-maps and Illustrations.*

Peru—Positions. *B.S.G. Lima* **25** (1909): 108–113. **Carvajal.**

Posiciones Geográficas de varios puntos de la costa del Perú. Por M. Melitón Carvajal.

South America. **Mozans.**

Following the Conquistadors: along the Andes and down the Amazon. By Dr. H. J. Mozans. New York and London: D. Appleton & Co., 1911. Size 9 × 6, pp. xx. and 542. *Sketch-map and Illustrations. Price* 12*s.* 6*d. net.*

Tierra del Fuego. *B.I.G. Argentino* **25** (1911): 5–23. ———

Breve reseña Geográfica y Estadística de Tierra del Fuego.

West Indies. **Lowe.**

A naturalist on desert islands. By Percy R. Lowe. London: Witherby & Co., 1911. Size 9 × 5½, pp. xii. and 300. *Maps and Illustrations. Price* 7*s.* 6*d. net. Presented by the Publishers.*

West Indies—Jamaica—Phytogeography. **Fawcett and Rendle.**

Flora of Jamaica, containing descriptions of the flowering plants known from the island. By William Fawcett and Alfred Barton Rendle. Vol. 1, Orchidaceæ. London: Longmans & Co., 1910. Size 8½ × 5½, pp. xviii. and 150. *Illustrations. Presented by the British Museum (Natural History).*

AUSTRALASIA AND PACIFIC ISLANDS.

Australia. **Nelson.**

Foster Frazer's fallacies, and other Australian essays. By Wallace Nelson. Sydney: Gordon & Gotch, [1911]. Size 7 × 5, pp. vi. and 218. *Presented.*

Australia—Historical. **Strang.**

The romance of Australia: its discovery and colonization; adventures of its explorers and settlers. ('The Romance of the World.' Edited by Herbert Strang.) London: H. Frowde and Hodder & Stoughton, [1911]. Size 9 × 6, pp. xii. and 640. *Sketch-map and Illustrations. Price* 6*s. Presented by the Publishers.*

Australia—Physiography. **Taylor.**

Commonwealth and Bureau of Meteorology, Bulletin No. 8. Physiography of Eastern Australia. By Griffith Taylor. Melbourne, [1911]. Size 12 × 10, pp. 18. *Sketch-maps and Sections.*

Caroline Islands—Yap. *B. American G.S.* **43** (1911): 510–518. **Churchill.**

The people of Yap. By William Churchill.

Kermadec Islands. *T. and P. New Zealand I.* **43** (1910–11): 524–539. **Oliver.**

The Geology of the Kermadec Islands. By W. Reginald B. Oliver. *Sketch-maps, Sections, and Illustrations.*

This is followed by various papers on natural history collections made during a recent visit.

Pacific islands. **Coombe.**

Islands of enchantment: many-sided Melanesia. Seen through many eyes, and recorded by Florence Coombe. London: Macmillan & Co., 1911. Size 9 × 6, pp. xxviii. and 382. *Sketch-map and Illustrations. Price 12s. net. Presented by the Publishers.*

POLAR REGIONS.

Antarctic—Exploration. **Nordenskjöld.**

Ymer; Ts. Svenska S. Antropologi och G. **31** (1911): 105–125.

Om resultaten af det senaste årtiondets sydpolsforskning. Af Otto Nordenskjöld. *Sketch-map, Illustrations, and Diagram.*

Summary of the results of the last ten years' work.

Antarctic—German Expedition. **Drygalski.**

Deutsche Südpolar-Expedition, 1901–1903 . . . herausgegeben von Erich von Drygalski. Vol. **12** (Zoologie, IV. Band). Berlin: G. Reimer, [1910–]1911. Size 13½ × 10, pp. viii. and 606. *Illustrations. Presented by the Imperial Foreign Office, Berlin.*

Antarctica. *G.Z.* **17** (1911): 331–336. **Alsberg.**

Das Südpolar-Land in seinen Beziehungen zur Verbreitung der Pflanzen und Tiere. Von Moritz Alsberg.

Arctic—Low-pressure areas. **Humphreys.**

B. Mount Weather Observatory **4** (1911): 13–14.

The Aleutian and Icelandic Lows. By W. J. Humphreys.

MATHEMATICAL GEOGRAPHY.

Cartography. *C.R.A. Sc. Paris* **153** (1911): 559–567. **Lallemand.**

Sur les déformations résultant du mode de construction de la Carte internationale du monde au millionième. Par Ch. Lallemand. *Diagrams.*

Cartography—Azimuth and Distance. **Nakamura.**

J.G. Tōkyō G. S. **23** (1911): 327–329.

On a map showing the Azimuth and distance from Tokyo. By S. Nakamura. *Map.* [In Japanese.]

Compass. **(Elphinstone.)**

The Anschütz gyro-compass: history, description, theory, practical use. [Edited by G. K. B. Elphinstone.] London: Elliott Bros., 1910. Size 10 × 6, pp. 112. *Illustrations and Diagrams. Presented by the Publishers.*

Latitude—Variation. *Mem. R. Astronomical S.* **60** (1911): 83–139. **Cookson.**

A Research on the Aberration Constant and the Variation of Latitude by Means of a Floating Zenith Telescope. By Bryan Cookson. *Illustrations and Diagrams.*

PHYSICAL AND BIOLOGICAL GEOGRAPHY.

Climatology. **Marriott.**

Why we may expect warmer winters. By Major R. A. Marriott. N.P. [1911]. Size 9½ × 6, pp. 18. *Diagrams.*

The diminishing obliquity of the ecliptic is assigned as a cause of observed climatic changes.

Geomorphology—Sand forms. *Annuaire géol. Russie* **13** (1911): 76–87. **Ivchenko.**

Surfaces sablonneuses secondaires. Par A. Iwtchenko. [In Russian; French *résumé*.]

Geophysics. *La G., B.S.G. Paris* **24** (1911): 31–40. **Pesci.**
Les lignes de fracture de la croûte terrestre. Par Dr. A. Pesci. *Sketch-map and Diagrams.*

Gravity—Instrument. *R. Engineers J.* **14** (1911): 41–44. **Hills.**
The Torsion Balance of Baron Eötvös. By Major E. H. Hills.
Some account of this instrument was also given by Mr. Hinks in his paper at the Research Department (August number, 1911, p. 185).

Hydrology. *Internat. Rev. Hydrobiologie, etc.* **4** (1911): 55–64. **Wedderburn.**
Some analogies between lakes and oceans. By E. M. Wedderburn.

Hydrology—Springs. *M.G. Ges. München* **6** (1911): 44–85. **Frank.**
Beziehungen zwischen Regenfall und Quellergiebigkeit unter besonderer Berücksichtigung der Münchener Wasserversorgung und der Kissinger Quellen. Von Dr. Ludwig Frank. *Diagrams.*

Meteorology. *J. and P.R.S. New South Wales* **44** (1910): 25–76. **Keele.**
The Great Weather Cycle. By T. W. Keele. *Diagrams.*

Oceanography—South Atlantic. **Cornelius.**
Ann. Hydrographie **39** (1911): 225–227.
Lotungen des Kabeldampfers "Stephan" auf der Strecke Monrovia—Pernambuco, 1911.
See note in the Monthly Record, vol. **38**, p. 435.

Sand. *Science* **33** (1911): 1005–1007. **Grabau.**
On the classification of sand-grains. By [Prof.] A[madeus] W. Grabau.

Seismology. **Agamennone.**
Atti R.A. Lincei V.; Rendiconti (Sc. fisiche) **20** (1) (1911): 797–802.
Sopra una presunta periodicità secolare nella ricorrenza dei grandi terremoti. Di G. Agamennone.

Seismology. *Rep. British Ass., Sheffield*, 1910 (1911): 44–71. **Milne.**
Seismological Investigations. Fifteenth Report. (Drawn up by Mr. J. Milne.) *Plan, Sketch-maps, and Diagrams.*

Terrestrial Magnetism—Map. *Petermanns M.* **57** (1911) [ii.]: 91–92. **Maurer.**
Neue Weltkarte zur Darstellung der Isogonen. *Map.*
Puts forward a special projection for the isogonic map.

Tide-gauges. *Internat. Rev. Hydrobiologie, etc.* **4** (1911): 129–135. **Murray.**
The observation of tides and seiches in frozen seas. By James Murray. *Illustrations.*

Volcanoes. *P. American A. Arts and Sc.* **47** (1911): 47–122. **Daly.**
The Nature of Volcanic Action. By Reginald A. Daly. *Sketch-map, Sections, and Illustrations;* size 9½ × 6. [Boston, 1911.] *Also separate copy.*

Zoogeography—Fish. **Hoek.**
Conseil Int. Exploration Mer, Pub. Circonstance, No. 57 (1911): pp. 72.
Laichgeschäft und Fang-Verhältniss der Gadiden-Arten in der Nordsee. Von P. P. C. Hoek.

ANTHROPOGEOGRAPHY AND HISTORICAL GEOGRAPHY.

Colonial Geography. *Z.G. Ges. Berlin* (1911): 400–405. **Jaegar.**
Wesen und Aufgaben der Kolonialen Geographie. Von Prof. Dr. Fritz Jaeger.

Commercial—Railways. **Talbot.**
The railway conquest of the world. By Frederick A. Talbot. ("Conquests of Science.") London: W. Heinemann, 1911. Size 9 × 5½, pp. xvi., 334. *Illustrations. Price 6s. net. Presented by the Publisher.*

Commercial—Text-book. **Unstead and Taylor.**
Commercial geography; general and regional. By J. F. Unstead and E. G. R. Taylor. London: G. Philip & Son, 1911. Size 7½ × 5, pp. viii. and 238. *Sketch-maps and Diagrams. Price 2s. 6d. Presented by the Publishers.*

Commercial—Trade routes. *Nautical Magazine* **86** (1911): 250–251. ——

North Atlantic Trade Routes.

Describes the routes agreed upon by the principal steamship companies for use at different seasons.

Commercial—Whaling industry. *National G. Mag.* **22** (1911): 411–442. **Andrews.**

Shore-Whaling: A World Industry. By Roy Chapman Andrews. *Illustrations.*

Disease—Beri-beri. *Philippine J. Sc.* **6** (1911): B., 251–258. **Chamberlain and Vedder.**

A contribution to the etiology of Beriberi. By Weston P. Chamberlain and Edward B. Vedder.

Experiments have eliminated a large proportion of the constituents of rice husks from the list of possible preventives of beri-beri (cf. vol. **36**, p. 619), but it is still uncertain in what precise substance the virtue lies.

Historical. **Myres.**

The dawn of history. By J. L. Myres. (Home University Library.) London: Williams & Norgate, [1911]. Size 7 × 4, pp. 256. *Price* **1s.** *Presented by the Author.*

Historical—Breydenbach. **Davies.**

Bernhard von Breydenbach and his journey to the Holy Land, 1483–4. A bibliography compiled by Hugh Wm. Davies. London: J. & J. Leighton, 1911. Size 13 × 10, pp. xxxii., 48, and [10]. *Facsimile Illustrations. Price* £4 **4s.**

In addition to the bibliography, there is a good deal of introductory matter on Breydenbach and his travels.

History of Navigation. **Chatterton.**

Fore and aft: the story of the fore and aft rig from the earliest times to the present day. By E. Keble Chatterton. London: Seely, Service & Co., 1912 [1911]. Size 9½ × 7, pp. 348. *Illustrations. Price* 16**s.** *net. Presented by the Publishers.*

Man and Earth. **Hellpach.**

Die geopsychischen Erscheinungen; Wetter, Klima und Landschaft in ihrem Einfluss auf das Seelenleben. Dargestellt von Dr. Willy Hellpach. Leipzig; W. Engelmann, 1911. Size 9 × 6, pp. vi. and 368. *Price* 6**m.** *Presented by the Publisher.*

An attempt to trace in detail the influence of external physical conditions on the human mind.

Military Geography. **Stavenhagen.**

Ueber die Bedeutung der Militärgeographie. Von W. Stavenhagen. (Sonderabdruck aus *Danzer's Armee-Zeitung*, Nr. 51–52 vom 22 Dezember, 1910.) [Vienna, 1910.] Size 9 × 6, pp. 6.

Tropical Physiology. *Philippine J. Sc.* **6** (1911) B: 101–130. **Aron.**

Investigation on the Action of the Tropical Sun on Men and Animals. By Hans Aron. *Illustrations and Diagrams.*

BIOGRAPHY.

Gilbert. **Gosling.**

The life of Sir Humphrey Gilbert, England's first Empire Builder. By William Gilbert Gosling. London: Constable & Co., 1911. Size 9 × 6, pp. x. and 304. *Maps, Portraits, and Illustrations (Facsimile and Original). Price* 12**s.** 6**d.** *net. Presented by the Publishers.*

Hakluyt. ——

The Hakluyt Society. A reproduction of the tablet erected in Bristol Cathedral to the memory of Richard Hakluyt, born 1522, died 1616. London, 1911. Size 9 × 6, pp. 4. *Facsimile.*

See note in vol. **36**, p. 227.

Hugues. **Ricchieri and Hugues.**

Nel Giubileo di Magistero del Prof. Ing. Luigi Hugues (20 Marzo 1910). [Address by Prof. Giuseppe Ricchieri; list of publications of Prof. Hugues; reply by the latter.] Casali, 1911. Size 9½ × 6½, pp. 60. *Portrait.*

Potter. *Ts. K. Nederl. Aardrijksk. Genoots.* II. Ser. **28** (1911): 602–627. **Wiersum.**

De 16de eeuwsche Landmeter Jan Potter en zijne Werken. Door Dr. E. Wiersum.

Jan Potter produced a large number of maps and plans of localities in Holland, of which a list is given.

GENERAL.

Bibliography. **Baschin.**

Bibliotheca Geographica . . . Herausgegeben von der Gesellschaft für Erdkunde zu Berlin. Bearbeitet von Otto Baschin. Band XVI., Jahrgang 1907. Berlin: W. H. Kühl, 1911. Size 9½ × 6, pp. xvi. and 522.

British Empire—Surveys.

The Surveys of British Africa, Ceylon, Cyprus, Fiji, Jamaica, Trinidad, British Honduras. The Annual Report of the Colonial Survey Committee. Sixth year. To 31st March, 1911. (Colonial Reports, Annual No. 685, 1911.) London, 1911. Size 9½ × 6, pp. 56. *Maps.*

Conservation of fauna. **Buckland.**

Pros and cons of the Plumage Bill. By James Buckland. [London, 1911.] Size 9 × 6, pp. 20.

Some revolting facts regarding the slaughter of birds in the plumage trade are put forward in support of the proposed Bill.

Conservation of fauna. **Rossetti.**

Istituto Coloniale Italiano: Biblioteca di Studi Coloniale, N. 14. Carlo Rossetti. La conservazione della fauna indigena nei paesi nuovi. Rome, 1911. Size 9½ × 6½, pp. 24.

Education. *G. Teacher* **6** (1911): 79–86. **Mackinder.**

The Teaching of Geography from an Imperial Point of View, and the use which could and should be made of Visual Instruction. By H. J. Mackinder.

Education—Field-work. *J.G.* **10** (1911): 8–12. **Dryer.**

Field Work in Physical Geography. By Charles R. Dryer.

Geography. **Camena d'Almeida.**

La terre: géographie générale. Par P. Camena d'Almeida. 4e édition. (P. Vidal de la Blache et P. Camena d'Almeida. Cours de géographie à l'usage de l'enseignement sécondaire.) Paris: A. Colin, 1909. Size 7 × 4½, pp. 624. *Sketch-maps and Illustrations. Price* 4.50 *fr. Presented by the Publisher.*

The same work is issued in the series "Bibliothêque Colin," under the title 'Géographie: la terre.'

Geography—Text-book. **Unstead and Taylor.**

General and regional geography for students. By J. T. Unstead and [Miss] E. G. Taylor. 2nd edit. London: G. Philip & Son, 1911. Size 8½ × 5½, pp. xii. and 516. *Sketch-map and Diagrams. Price* 6*s. Presented by the Publishers.*

See review in the present number, p. 68.

Hints to Travellers. **Ward.**

The Sportsman's handbook to collecting, preserving, and setting-up trophies and specimens; together with a guide to the hunting-grounds of the World. By Rowland Ward. 10th edit. London: Rowland Ward, Ltd., 1911. Size 7½ × 5, pp. xxiv. and 304. *Illustrations. Price* 3*s.* 6*d. net. Presented by the Publishers.*

Travel. **Bates.**

Touring in 1600: a study in the development of travel as a means of education. By E. S. Bates. London: Constable & Co., 1911. Size 9 × 6, pp. xiv. and 418. *Facsimile Maps and Illustrations. Presented by the Publishers.*

Travel. **Carson.**

Ranching, sport, and travel. By Thomas Carson. London: T. Fisher Unwin, 1911. Size 9 × 5½, pp. 320. *Illustrations. Price* 10*s.* 6*d. net. Presented by the Publisher.*

NEW MAPS.

By E. A. REEVES, *Map Curator*, R.G.S.

EUROPE.

Austria—Vienna. **Freytag.**

Gesamtplan von Wien. Scale 1: 25,000 or 2·5 inches to 1 stat. mile. *Price* 4 *kr.*

G. Freytag's Plan des Wiener Zentralfriedhofes. Scale 1: 6000 or 10·6 inches

to 1 stat. mile. Vienna: G. Freytag & Berndt, [1911]. *Presented by the Publishers.*

Baltic Sea. **Spethmann.**

Tiefenkarte der Beltsee. Von Dr. Hans Spethmann. Scale 1:340,000 or 1 inch to 5·4 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II., Tafel 29. Gotha: Justus Perthes, 1911. *Presented by the Publisher.*

Belgium. **Deventer.**

Atlas des Villes de la Belgique au XVI^e^ siècle. Cent plans du géographe Jacques de Deventer exécutés sur les ordres de Charles-Quint et de Philippe II. Reproduits en facsimilé chromographique par l'Institut National de Géographie, à Bruxelles. Publication commencée par feu Ch. Ruelens, et continuée sous la direction de Em. Ouverleaux et J. van den Gheyn, S.J. 19^e^ Livraison. Brussels: M. Weissenbruch; Falk Fils, [1911].

The present part of this interesting facsimile atlas contains plans of Lens, Montfort, Ostende, and Vilvorde, each of which, as in the case of previous parts, is accompanied by descriptive and explanatory text, and a key plan.

British Isles—England and Wales. **Ordnance Survey.**

Sheets published by the Director-General of the Ordnance Survey, Southampton, from November 1 to 30, 1911.

6-inch scale maps:—

Revised, with contours in blue.

Cheshire, 4 sheets. **Hampshire**, 3 sheets. **Lancashire**, 1 sheet. **Sussex**, 1 sheet. *Price* 1*s. each.*

6-inch scale maps:—

With contours in black.

Lancashire, 1 sheet. **Lincolnshire**, 4 sheets. **Yorkshire**, 1 sheet. *Price* 1*s. each.*

1:2500 scale maps:—

Revised, with houses stippled and with areas.

Berkshire, 7 sheets. **Cheshire**, 13 sheets. **Denbighshire**, 2 sheets. **Flintshire**, 3 sheets. **Lancashire**, 18 sheets. **Sussex**, 25 sheets. **Yorkshire**, 16 sheets. *Price* 3*s. each.*

(*E. Stanford, London Agent.*)

British Isles—Scotland. **Gwinnell.**

Relief model of the Central Part of the Isle of Skye, Inverness-shire, to illustrate the Influence of Rock-structure on Scenery. By Russell F. Gwinnell, B.SC., F.G.S. Horizontal scale 1:31,680 or 2 inches to 1 stat. mile, vertical scale 1:25,344 or 2·5 inches to 1 stat. mile. London, 1911. *Price* £6. *Presented by Russell F. Gwinnell, Esq., B.Sc., F.G.S.*

This model has been constructed by Mr. Russell F. Gwinnell specially to illustrate the influence of rock-structure on scenery, for which purpose it should be useful. It is accompanied by some excellent photographs of various types of scenery in the district, which greatly enhance the value of this model from an educational point of view, specially as they are clearly labelled, and the position from which they were taken is indicated on the model.

The model itself is made of plaster, and measures about 3 by 2 feet. One great point in its favour is the fact that there is little exaggeration of vertical scale, and it would perhaps have been an advantage to have made the horizontal and vertical scales the same. The rugged features of the island are in places hardly sufficiently brought out, but the photographs help to give the true impression. On the whole, it is a useful model, and Mr. Gwinnell is of opinion that the geologist will find it an interesting companion to the Geological Survey memoir on 'The Tertiary Igneous Rocks of Skye.' It will doubtless find a place in educational establishments, and can be obtained in three styles: uncoloured, £4; coloured according to height of land, £6; and geologically coloured, with place-names added, £10. The copy Mr. Gwinnell has presented to this Society is coloured to show height of land. It is placed in a glass case in the Map Room, with the framed photographs above.

Europe. **Reimer.**

Militarisch-Geographische Karte zur Uebersicht der gegenwärtigen politischen Lage in Europa und den Mittelmeerländern. Scale 1:4,000,000 or 1 inch to 63·1 stat. miles. Berlin: Dietrich Reimer (Ernst Vohsen), 1911.

This is an instructive map, and one that should prove specially interesting at the present time. It includes the greater part of Europe with the whole of the basins of the Mediterranean and Black sea, and gives, by means of symbols and statistical tables, a large amount of information concerning the military and naval strengths of the various European countries in peace and war, areas, populations, distances between various ports on the west coast of Europe and the Mediterranean and Black seas, steamer routes, railways, wireless telegraph stations, and other particulars of a kindred nature. The figures concerning many of the naval and military matters can only be approximate, and naturally the data required to make the map complete must in many cases be inaccessible, but it contains a great deal of information that cannot fail to be of use at the present time.

Germany. **K. Preuss. Landesaufnahme.**

Karte des Deutschen Reiches. Königreich Preussen. Herausgegeben von der Kartogr. Abteilung der Königl. Preuss. Landesaufnahme. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Kupferdruckausgabe. Sheets: 120, Anklam; 121, Swinemünde; 152, Neubrandenburg; 153, Friedland in Mecklenburg; 154, Pasewalk; 184, Neustrelitz; 386, Bleicherode; 411, Mühlhausen i. Thrgn.; 434, Ziegenhain; 541, Birkenfeld. Berlin: K. Eisenschmidt, 1911. *Price* 1.50*m. each sheet.*

Norway. **Norges Geografiske Opmaaling.**

Topografisk Kart over Kongeriket Norge. Scale 1 : 100,000 or 1 inch to 1·6 stat. mile. Sheets: L 11, Nordfold; 20 A, Nannestad; 31 C, Nordre Fron. Christiania: Norges Geografiske Opmaaling, 1906–1911. *Presented by the Norwegian Geographical Institute.*

Norway. **Norges Geologiske Undersøkelse.**

Geologisk Kart over Kongeriget Norge. Scale 1 : 100,000 or inch to 1·6 stat. mile. Sheet: 42 D, Rennebu. Christiania: Norges Geologiske Undersøkelse, 1910. *Presented by the Norwegian Geographical Institute.*

Portugal. **Commissão do Serviço Geologico, Lisbon.**

Carta Hypsometrica de Portugal. Scale 1 : 500,000 or 1 inch to 7·9 stat. miles. 2 sheets. Lisbon: Commissão do Serviço Geologico, 1906.

This is a carefully drawn and clearly printed map, showing heights and depths in colour tinting. The former are in tints of green and brown at intervals in metres of 0–25, 25–50, 50–200, 200–400, 400–700, 700–1200, 1200–1400, and above 1400. Depth of water is shown in two tints of blue, a light one for under 200 metres and a darker for over 200 metres. There are numerous land heights and ocean depths also indicated by figures. Railways constructed, under construction, and projected are also indicated.

Russia. **Kuchinka.**

Militärgeographische Skizze des Polesie (West Russland). Entworfen von Hauptmann G. Kuchinka. Scale 1 : 1,500,000 or 1 inch to 23·6 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II., Tafel 40. Gotha: Justus Perthes, 1911. *Presented by the Publisher.*

ASIA.

India. **Rennell.**

The Bengal Atlas, containing maps of the Theatre of War and Commerce on that side of Hindoostan, by Major James Rennell, 1783. Reproduced by heliozincography at the Survey of India Offices, Calcutta, 1910. *Presented by the Surveyor-General of India.*

This famous atlas was first published in one folio volume in 1779. A second edition appeared in 1781, and it is this, with two additional plans and corrections that constituted the 1783 edition, which has now been reproduced in facsimile by the Survey of India. Up to Major Rennell's time nothing approaching accurate survey work had been undertaken in Bengal, and no proper maps of the country had been made, but on his appointment to the position of first Surveyor of India, in 1764, he set to work in earnest, and very soon excellent maps and plans from careful surveys were prepared. These proved of the greatest value during the military operations of those times, and have even since been considered as monuments to the surveyor's skill and energy. Those interested in this atlas should read Sir Clements Markham's account of the work and life of Major James Rennell, published in the Century Science Series in 1895. There are two copies of the original Bengal Atlas in the Society's collection, both of which are of the 1781 edition.

Indian Government Surveys. **Surveyor-General of India.**

Maps published by the Survey of India during the quarter ending September 30, 1911: Railway and canal map of India (without hills), corrected up to March 31, 1910, scale 1 inch to 32 miles; India showing railways open and under construction on March 31, 1911; India and adjacent countries, scale 1:1,000,000, 3 sheets (provisional issue). Standard maps, scale 1 inch to 1 mile: Bengal, 2 sheets (preliminary edition); Berar, 1 sheet; Berar and Central Provinces, 1 sheet; Burma, 2 sheets; Central India, 1 sheet (preliminary edition); Central Provinces, 4 sheets; Central Provinces and Central India, 3 sheets; Madras, 2 sheets; Punjab, 1 sheet; Punjab and North-West Frontier Province, 1 sheet; United Provinces, 1 sheet (preliminary edition); United Provinces and Central India, 2 sheets (preliminary edition), Calcutta: Survey of India, Map Record and Issue Office, 1911. *Presented by the Surveyor-General of India.*

Java. **Topographical Bureau, Batavia.**

Overzichtskaart van de Residentie Banjoemas. Scale 1:250,000 or 1 inch to 3·9 stat. miles. Batavia: Topographical Bureau, 1910.

Palestine. **Schumacher.**

Karte des Ostjordanlandes, aufgenommen von Dr. G. Schumacher, herausgegeben vom Deutschen Verein zur Erforschung Palästinas. Scale 1:63,360 or 1 inch to 1 stat. mile. Sheet A 4. Leipzig: J. C. Hinrichs, [1911.]

The first two sheets of this important map were noticed in the *Geographical Journal* for March, 1909. The present sheet extends in latitude from 32° 25′ to 32° 40′ N. and from longitude 35° 30′ to 35° 52′ E. The map forms a continuation to the east of the Jordan of that of Western Palestine by the English Palestine Exploration Fund, published in 1880, on the same scale.

AFRICA.

Morocco. **Schnell.**

Das Bergland westlich von Fas. Entworfen und gezeichnet von Prof. Dr. P. Schnell. Scale 1:200,000 or 1 inch to 3·2 stat. miles. *Petermanns Mitteilungen*, Jahrgang 1911, II., Tafel 30. Gotha: Justus Perthes, 1911. *Presented by the Publisher.*

Uganda. **Geographical Section, General Staff.**

Map of Uganda. Scale 1:250,000 or 1 inch to 3·9 stat. miles. Drawn and printed in the Geographical Section, General Staff. 8 sheets. London: Edward Stanford, Sifton Praed, T. Fisher Unwin, 1911. *Price* 18*s.* *Presented by the Director of Military Operations, Geographical Section, General Staff, War Office.*

The topographical survey of Uganda is doubtless the most satisfactory and complete of any work of the kind so far undertaken in tropical Africa. In 1909, when the survey was commenced, a triangulation of the country had been in progress for some time, under the superintendence of Mr. R. C. Allen, the Director of Surveys, but, with much other special survey work on hand, the progress was slow, and as a topographical survey of the kingdom of Buganda was urgently needed, it was decided to send out a special party of the Royal Engineers to carry out this work, which has now been brought to a most successful termination. The party was placed in charge of Captain W. C. Macfie, R.E., who had as assistants Lieut. W. D. Pennington, R.E., and six non-commissioned officers. Of these, Lieut. Pennington and one of the non-commissioned officers died whilst engaged on the work.

The survey is now published in nine sheets, on the scale of 1:250,000, which have been excellently produced and printed in colours, under the superintendence of Colonel C. F. Close, C.M.G., R.E., at the War Office, who has all through taken a leading part in the undertaking. Eight of these sheets are now ready and bound together in a portfolio. The other sheet, which includes the Mount Ruwenzori region, is kept back for the present pending the final arrangement of the boundary. It will, however, be issued shortly.

During the nineteen months of field operations the area topographically surveyed was 13,500 square miles, and of this 5000 square miles were based on the triangulation carried out by Mr. R. C. Allen, and the remainder on that undertaken by the Royal Engineers themselves. 5400 square miles, shown on the maps, were topographically surveyed on the scales of 1:62,500 and 1:125,000 by Messrs. J. McGregor, A. Richardson, J. R. Fraser, and E. G. Fenning, of the Uganda Survey Department, under the direction of Mr. Allen, during the years 1904–1908, and 3400 square miles were surveyed by Lieut. C. E. Fishbourne, R.E., in the year 1908, on the scale of 1:125,000,

the greater part of whose work lies between Lake Victoria and Lake Kioga. The regions embracing Lakes Albert and Edward and Mount Ruwenzori, consisting of 8500 square miles, was surveyed by the Uganda-Congo Boundary Commission, under the command of Major R. G. T. Bright, C.M.G., during the years 1906–1908, on the scale of of 1:250,000. The strip along the parallel of 1° S. was surveyed by the Anglo-German Boundary Commission, under Colonel C. Delmé-Ratcliffe, C.M.G., of 1902–1904, on the scale of 1:100,000, the portion used of this work being about 600 square miles. The line from Kampala to Lake Albert is from the work of a railway survey party under Captain A. E. Stevenson, R.E., in 1907–1908, of which survey a strip of about 500 square miles was used in the map. The total surveyed area represented on the sheets of this map is 32,000 square miles.

Great credit is due to all the surveyors who have taken part in this work, and the rapidity with which they have brought it to so successful a termination speaks well for their industry and energy.

Wadai. **Meunier.**

Carte du Ouadaï dressée par A. Meunier d'après les travaux de Nachtigal, de MM. les Commandants Julien et Maillard, les Capitaines Arnaud, Chauvelot, Faure et Fiegenschuh et les Lieutenants Bourreau, Crépin, Delacommune, Georg, Hamel, de Jonquières, Jourdy, Lucien, Reymond, Rupied et Vasseur, Scale 1:1,000,000 or 1 inch to 15·8 stat. miles. Paris: Service Géographique des Colonies, 1911.

As indicated by the title, this is a compilation from the route sketches of explorers and French officers who have travelled in this little-known part of Africa. It will doubtless be a considerable time before anything approaching accurate survey work is done in Wadai, and meanwhile this map will be of considerable service. It may be useful to note that the position of Abecher is given in figures, according to the determination of Lieut. Jourdy, as lat. 13° 49′ N. and long. 20° 35′ E.

AMERICA.

Canada. **Department of the Interior, Ottawa.**

Atlas of Canada. Sheet No. 7. Minerals. Scale 1:6,336,000 or 1 inch to 100 stat. miles. Ottawa: Department of the Interior, [1911]. *Presented by the Department of the Interior, Ottawa.*

Canada. **Dept. of the Interior, Ottawa.**

Map of Ontario and Quebec, showing location and capacity of flour-mills and elevators, October, 1911. Prepared in the Railway Lands Branch, R. E. Young, D.L.S., Chief Geographer and Supt. Railway Lands Branch. Scale 1:1,584,000 or 1 inch to 25 stat. miles. Ottawa: Department of the Interior, 1911. *Presented by the Department of the Interior, Ottawa.*

Canada. **Geographic Board of Canada.**

Map of Franklin. Scale 1:3,168,000 or 1 inch to 50 stat. miles. Maps of Keewatin, Quebec, Ungava, Yukon and Mackenzie. Scale 1:2,217,600 or 1 inch to 35 stat. miles. From the Ninth Report of the Geographic Board of Canada. Part IV. Ottawa, 1911. *Presented by the Geographic Board of Canada.*

A useful series of maps compiled from the most reliable information. In many parts much exploration work remains to be done, as evidenced by the numerous blank spaces that still exist on the maps. A note on each map states that the boundaries, which are shown in colour, are as recommended in the Order in Council of December 18, 1897, and as there was no subsequent legislation, these are without legal authority, and are only used for convenience of description. In the case of Keewatin, a narrow strip of the former district of Athabaska has been added. The maps accompany Mr. James White's 'Place-Names in Northern Canada.'

Canada—Ontario. **Dept. of the Interior, Ottawa.**

Mineral District, Northern Ontario. Scale 1:250,000 or 1 inch to 3·95 stat. miles. 2 sheets. Ottawa: Department of the Interior, 1911. *Presented by the Department of the Interior, Ottawa.*

A well-executed map, printed in colours, showing districts, townships, villages, post villages, boundaries, railways, land lots and commons, road allowances and other similar information. Land heights are indicated by figures only without shading or contours. Portages and rapids are also marked. Altogether the map gives much useful and up-to-date information.

Canada—Vancouver island. **Hibben & Co.**

Map of Vancouver Island and adjacent islands. Scale 1 : 253,440 or 1 inch to 4 stat. miles. 2 sheets. Compiled from the latest information, and published by T. N. Hibben & Co., Victoria, B.C., 1910.

This map is in two sheets, each of which measures 54 by 42 inches. It will be principally useful to those interested in purchase of land and land locations. All properties are shown by coloured squares with their respective numbers. Letters on the squares indicate timber licences, coal licences, pre-emption record, application to purchase, and other particulars of a similar nature. Timber lands are coloured green, and land sold by the E. and N. Railway Company, yellow. No hill shading is given on the map, so that the special information, though very detailed, is not obscured. Railways, roads, and trails are indicated, as are also Indian and lighthouse reserves.

United States. **Dept. of the Interior, Washington.**

United States, including Territories and Insular Possessions, showing the extent of Public Surveys, Indian, Military, and Forest Reservations, Railroads, Canals, National Parks, and other details. Compiled under the direction of I. P. Berthrong, Chief of the Drafting Division, and corrected to June 30, 1910. Scale 1 : 2,344,320 or 1 inch to 37 stat. miles. Washington : Department of the Interior, General Land Office, 1910. *Presented by F. Dennett, Esq., Commissioner, Department of the Interior, General Land Office, Washington, D.C.*

AUSTRALASIA.

Queensland. **Queensland Geological Survey.**

Sketch-map of the Croydon and Etheridge Goldfields. Scale 1 : 380,160 or 1 inch to 6 stat. miles. Sketch-map of Cape York Peninsula Gold and Mineral Fields. Scale 1 : 380,160 or 1 inch to 6 stat. miles. Sketch-map of Goldfields in the Vicinity of Charters Towers. Scale 1 : 253,440 or 1 inch to 4 stat. miles. Prepared at the Geological Survey Office, Department of Mines. Brisbane, 1911. *Presented by the Queensland Geological Survey.*

Queensland. **Survey Office, Brisbane.**

Queensland, showing the main roads, railway lines, telegraph lines and stations, and Government artesian bores and tanks. Scale 1 : 2,534,400 or 1 inch to 40 stat. miles. Brisbane : Survey Office, Department of Public Lands, 1911.

ATLANTIC ISLANDS.

Tenerife. **Deposito de la Guerra, Madrid.**

Plano de la Isla de Tenerife. Scale 1 : 50,000 or 1·3 inch to 1 stat. mile. Madrid : Deposito de la Guerra, 1907.

A general map of Tenerife, showing relief by contours in black at intervals of 100 metres. The character of the roads and tracks are indicated, and a considerable amount of detailed information given. However, the style in which the map has been produced is by no means satisfactory, and many of the names can only be read with difficulty.

GENERAL.

World. **Philip.**

Philips' Chamber of Commerce Atlas. A graphic survey of the World's trade with a commercial compendium and gazetteer index. London : George Philip & Son, Ltd., 1912. *Price 6s. net. Presented by the Publishers.*

This atlas is an attempt to present, in a graphic and at the same time handy and inexpensive form, an exhaustive summary of the present economic conditions of the globe. By means of 128 plates of maps, and 144 pages of text a large amount of information is given on the commerce of the world, the sources of supply, the world's markets, natural resources of different countries, and numerous other kindred subjects. Many of the diagrams are decidedly graphic; but some of the maps are rather confused and indistinct, partly owing to the attempt to show too much, and partly to the fact that they are not so clearly printed as they might have been. The text contains a useful commercial compendium of the world's principal commodities, and a good gazetteer index, which, besides giving the position of places, states their chief manufactures and industries. The atlas will doubtless be found very useful, and considering the amount of information it contains, is remarkably cheap.

World. **St. Martin and Schrader.**

Atlas universel de Géographie construit d'après les sources originales et les documents les plus récents, cartes, voyages, mémoires, travaux géodésiques, etc., avec un texte analytique. Ouvrage commencé par M. Vivien de Saint Martin et continué par Fr. Schrader. Feuille 50, Arabie. Paris: Hachette & Cie., [1911]. *Presented by the Publishers.*

This is sheet v. of the ten-sheet map of Asia, and includes Arabia and the south-western part of Persia. A list of the cartographical material is given on a separate sheet, but in some parts the map is not quite up to date. Sir W. Willcocks' recent surveys in the Lower Euphrates do not appear to have been used, neither has full advantage been taken of the maps of Colonel Miles and Captain Leachman, which were published in the *Geographical Journal* within the last two years, although they are mentioned in the list of material.

World. **Schrader.**

L'Année Cartographique. Supplément annuel à toutes les publications de géographie et de cartographie. Dressé et rédigé sous la direction de F. Schrader. Vingt et unième année. Paris: Hachette & Cie., 1911. *Presented by the Publishers.*

This useful geographical annual has now reached its twenty-first year of publication, and continues to form a handy summary of the principal explorations and geographical events for each year. There are three sheets in the present issue—one devoted to Asia, another to Africa, and a third to America. Among the principal explorations and surveys dealt with are those of Stein, Bacot, Fergusson, Weiss, Kozloff, Carruthers, and Leachman in Asia; Villatte, Volz, and Braithwaite-Wallis in Africa; and Fawcett, Candido Bondoro, Herzog, Hamilton Rice and Ladonce in South America. In addition to these maps, there are others showing new boundary-lines. As usual, brief accounts of this recent geographical work, with tables of newly determined positions and other information, are given in the text which appears on the back of the maps. It is satisfactory to find the maps and papers published in the *Geographical Journal* have furnished the basis of a large amount of the contents of this number, and that at least four of the explorers whose survey work is here referred to, received instruction at the Society. The Society's map of South Peru and North Bolivia has been specially noticed.

World. **U.S. Geological Survey.**

International Map of the World. Scale 1: 1,000,000 or 1 inch to 15·8 stat. miles. Sheets: North K 19, Boston. Washington: U.S. Geological Survey, 1911.

A preliminary proof-sheet of the 'International Map of the World,' which was noticed in the *Geographical Journal* of last month. It has been compiled by the U.S. Geological Survey. In its present form the sheet is without orographical tinting, and in other respects is not very satisfactory, but this is doubtless due to the fact that it is only a provisional issue.

CHARTS.

Admiralty Charts. **Hydrographic Department, Admiralty.**

Charts and Plans published by the Hydrographic Department, Admiralty, from November 5 to December 2, 1911. *Presented by the Hydrographer, Admiralty.*

New Charts—No. 2503, Scotland, west coast: Lochs Laxford and Inchard, and approaches, 3*s.* 152, North Sea, Denmark: Esbjerg to Hanstholm, 2*s.* 813, Indian ocean: Ceylon, south part, south of lat. 7° 20′ N., 3*s.* **New Editions**—1613, England, south coast: Bigbury bay to Exmouth, showing approaches to Salcombe, Dartmouth, and Tor bay, 3*s.* 2474, Scotland, west coast: Hebrides or Western isles, from Barra head to Scarpa island, 3*s.* 2167, Scotland, north-east coast: Firth of Cromarty, 3*s.* 3547, Scotland, east coast: Logie Head to Tarbet ness, including the entrances to Inverness and Cromarty firths (Plans: Buckie, Lossiemouth, Hopeman, Burghead), 4*s.* 2114, Baltic entrance: The Kattegat (Plans: Frederikshavn, Anholt harbour, Skagen harbour, Osterby harbour), 3*s.* 1195, Mediterranean: Spain, east coast: Approach to port of Barcelona, Port of Barcelona, 3*s.* 2544, South America, east coast: Rio de la Plata (Plans: Port la Plata, Lobos), 4*s.* 1749, South America, east coast: Monte Video to Buenos Aires, with Archimedes and English banks, 3*s.* 6*d.* 1901, British Columbia: Ogden channel with anchorages between Cape Caution and Port Simpson (Plans: Ogden channel and adjacent passages, Holmes bay, McLaughin bay, Carter bay, Kynumpt harbour, Goldstream harbour, Namu harbour, Safety cove, Schooner Retreat, Stuart anchorage), 3*s.* 802, Islands in the Southern Indian ocean: Prince Edward

islands, Heard and McDonald islands, Crozet islands (Plan: Ship cove), 2*s.* 1417, South Pacific ocean: Chatham islands (Plans: Skirmish bay or Kaingaroa, Port Waïtangi, Whangaroa or Port Hutt), 2*s.*

Atlantic, North. **U.S. Hydrographic Office.**

Pilot chart of the North Atlantic Ocean, November, 1911. Washington: U.S. Hydrographic Office, 1911. *Presented by the U.S. Hydrographic Office.*

Atlantic, North, and Mediterranean. **Meteorological Office.**

Monthly Meteorological charts of the North Atlantic and Mediterranean, December, 1911. London: Meteorological Office, 1911. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **Meteorological Office.**

Monthly Meteorological charts of the Indian Ocean, December, 1911. London: Meteorological Office, 1911. *Price 6d. each. Presented by the Meteorological Office.*

Indian Ocean. **U.S. Hydrographic Office.**

Pilot chart of the Indian Ocean, January, 1912. Washington: U.S. Hydrographic Office, 1912. *Presented by the U.S. Hydrographic Office.*

Pacific, North. **U.S. Hydrographic Office.**

Pilot chart of the North Pacific Ocean, January, 1912. Washington: U.S. Hydrographic Office, 1912. *Presented by the U.S. Hydrographic Office.*

PHOTOGRAPHS.

Rhodesia. **Clark.**

Sixty-three photographs of Barotseland taken by Percy M. Clark, Esq., 1903–1905. *Presented by Percy M. Clark, Esq.*

A good set of photographs of the Zambezi river above the Victoria falls, with views of the neighbouring country. Some of them, such as those of the Ngonyi falls, are specially interesting. There are also some excellent views of the Victoria falls.

(1) Rocks in the Matopo hills; (2) Waggon travelling, Southern Rhodesia; (3) Bullock waggon, Wankie; (4) "Mica hill" on road to Wankie and Victoria falls; (5) Construction of Zambezi bridge; (6) Boys working on foundation of Zambezi bridge; (7) Electric Blondin, used for crossing bridge material to north bank of Batoka gorge; (8) Crossing the Batoka gorge in Bosun's chain, before the bridge was made; (9) Pontoon crossing Zambezi above the Victoria falls; (10) Where the Masui river flows into the Batoka gorge; (11) Sekoti's drift, old port of entry into North Rhodesia before the Zambezi bridge was built; (12) Outspan at Sekoti's drift; (13 and 14) Pontoon crossing Sekoti's drift; (15) Native dug-outs, upper Zambezi; (16) Fleet of native dug-outs, upper Zambezi; (17 and 18) Dug-outs, upper Zambezi; (19) Travelling on upper Zambezi; (20) Mission station, Sesheke; (21 and 22) Numbwe cataract, upper Zambezi; (23) Hippo shot in Zambezi; (24) Hippo in Zambezi; (25) Water-holes on the road to the Zambezi; (26) Reed buck, Simorocco flats; (27) Zebra, Simorocco flats; (28) Puku; (29) Giraffe in thick bush; (30 and 31) On the Kasia river; (32) Lui river; (33) A Barotse granary; (34) A Barotse blacksmith; (35) Building grass shelter for sleeping under at night; (36) An up-country trading store; (37) Barotse water-carrier; (38) A Barotse salutation; (39) Letia Lewanika (1903), future king of the Barotse; (40) A Barotse witch doctor's dancing mask; (41) Barotse riding bullock; (42) Barotse native; (43) Making beltong; (44) "Makoras," or native dug-outs; (45 and 46) In a Matabele kraal; (47) The "Marimba" native musical from north of the Kafue river; (48) Ngonya falls, upper Zambezi; (49–53) Part of Ngonya falls; (54–57) One of the cataracts, Ngonya falls; (58) Rapids below Ngonya falls; (59 and 60) Pulling dug-outs around the Ngonya falls.

N.B. It would greatly add to the value of the collection of Photographs which has been established in the Map Room, if all the Fellows of the Society who have taken photographs during their travels, would forward copies of them to the Map Curator, by whom they will be acknowledged. Should the donor have purchased the photographs, it will be useful for reference if the name of the photographer and his address are given.

NOTE.
In this map the physical features have been generalised, and only a fe
given in addition to those mentioned in Sir Alfred Sharpe's paper. Th
material has been utilised in the construction, including boundary surveys,
new official maps of Southern Rhodesia and Nyasaland, and Beringer's Ma
Rhodesia. To these, route traverses of explorers, of a more or less reliable
adjusted. The new geodetic arc runs from south to north through the centr
forms an important basis for all survey work in the region. Heights marked
as reliable, all others, shown thus 3287, are approximate, and mainly depe
hypsometrical observations.
LAKE TANGANYIKA
2624
LAKE BANGWEULU
3700
LAKE MWERU
3000
GERMAN
BELGIAN CONGO
NORTH-EASTERN RHODESIA
NORTH-WESTERN RHODESIA
NYASALAND PROTECTORATE
SOUTHERN RHODESIA
Mashonaland
BECHUANALAND PROTECTORATE
Kibara Mts.
Mumbo Mts.
Kundelungu Mts.
Muchinga Mts.
Mafinga Mts.
Luvua R.
R. Luapula
R. Lualaba
R. Lukuga
R. Lunga-Lunga
R. Loangwa
R. Chambezi
R. Luangwa
R. Kafue
R. Zambezi
R. Sanyati
R. Hunyani
R. Mazoe
R. Gwai
R. Shangani
R. Gwelo
R. Sabi
R. Rusitu
R. Pungwe
R. Buzi
R. Lucite
R. Kamalondo
Kambove
Ndola
Kasama
Mpika
Petauke
Chinsali
Abercorn
Fife
Broken Hill
Great Lukanga Swamp
Sitanda
Mwomboshi
Chasanza
Kafue
Lusaka
Sakania
Kalonga
Bwana Mkubwa
Kawalo
Serenje
Mkushi
Ft. Jameson
Ft. Manning
Tete
Zumbo
Feira
Luia or Rua
Mt. Chera
Umtali
Salisbury
5052
Ayrshire
Eldorado
Mtoko
Umvuma
Gwelo
4021
Enkeldoorn
Que Que
Selukwe
Chalimanzi
Sebungwe
Hartley
Marandellas
Umsapi
Melsetter
Bulawayo
Mt. Darwin
Mrewa
Inyanga
Penkolera
Kiambi
Bwalwalwille
Kasama
Mporokoso
Mpweto
Mabanga
Kalungwizi
Kilwa
Mutungwe
Mt. Mofwe
Kazenga
Kipaila
Ft. Rosebery
Elisabethville
Kalonga
Shangwila
Kasama
Mwenga
Ft. Roberts
Katumbi
Mpika
Luena
Kawambwa
Kasenga
Ft. Jameson
Ft. Manning
Petauke
Mwomboshi
Chasanza
Kafue
Lusaka
Sakania
Bwana Mkubwa
Kawalo
Broken Hill
Great Lukanga Swamp
Sitanda
Kambove
Feira
Zumbo
Luia or Rua
Mt. Chera
Tete
Umtali
Umvuma
Gwelo
Enkeldoorn
Que Que
Selukwe
Chalimanzi
Sebungwe
Hartley
Marandellas
Umsapi
Salisbury
Ayrshire
Eldorado
Mtoko

oyal Geographical Society.

BRITISH CENTRAL AFRICA
Sharpe.